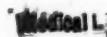


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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society



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VOL. XII

May, 1929

No. 5

LYMPHOSARCOMA OF THE COLON AND RECTUM*

FRED W. RANKIN, M.D., and CHARLES L. CHUMLEY, M.D.
Rochester, Minnesota

EWING has defined lymphosarcoma as true malignant neoplasm arising in lymphatic tissue from proliferation of atypical lymphocytes. Various other terms have been assigned to this type of tumor, such as lymphoblastoma and lymphocytoma. Many considered it identical with the small round-cell sarcoma. Lymphosarcomatosis is the term used to designate the widespread form of the disease.

To Kundrat belongs the credit of having isolated lymphosarcoma from the group of closely allied diseases of the lymphatics, all of which were formerly included under the term pseudo-leukemia or aleukemic lymphoma. Kundrat not only described the gross and microscopic changes of this condition but also the clinical characteristics; it is well known that such a study is necessary in order to make a diagnosis of lymphosarcoma in any case. He then described this tumor as one arising from groups of lymph nodes or from collections of adenoid tissue elsewhere, especially that in relation to mucous membranes. He pointed out that in lymphosarcoma, in contradistinction to leukemia and pseudoleukemia, the systemic effects are lacking, the spleen, liver, blood and bone marrow being involved only rarely.

Although Kundrat recognized lymphosarcoma as essentially a regional disease, he found that the growth does not remain limited to the site of origin but extends beyond the capsules of the lymph nodes or follicles, leading to coalescence of the individual elements and infiltration of the surrounding tissues, and then spreading, as a rule, through the lymphatics to the neighboring lymph nodes or follicles; in solid tissues the ex-

tension is along the lines of least resistance and in a hollow viscus lined with mucous membrane, it spreads along the submucosa in a circular manner, expanding over a great area, and has been supposed to increase rather than decrease the lumen of such a viscus as the intestine.

Kundrat found that not only is the extension of lymphosarcoma local and regional but that similar growths may also be found in other organs more or less distant from the original site. These usually assume the form of diffuse infiltrations which differ from the ordinary metastatic lesions found in carcinoma or sarcoma in not being nodular and circumscribed. He believed that if a careful search were made in such cases a continuous lymphatic connection could be demonstrated between the primary and secondary growths in that the lymph nodes between the two would be similarly affected. He also believed that the presence of many of the remote formations could be explained by retrograde lymphatic extension rather than by the hematogenous route.

Singer reported a case of lymphosarcoma of the stomach which he considers a substantiation of Kundrat's theory. Ewing believes that the extension of these tumors solely by permeation of the lymphatics is probably variable. Although there is a tendency for the rapidly growing tumor cells to compress the small blood vessels, microscopic study frequently reveals the cells within the lumen of such vessels.

The information with regard to the origin of lymphosarcoma is entirely hypothetical, as is the case in all types of tumors. McFarland considers lymphosarcoma identical with small, round-cell sarcoma. He tabulated the following hy-

*From the Division of Surgery, The Mayo Clinic, Rochester, Minn. Submitted for publication March 20, 1929.

potheses which attempt to explain the origin of the cells making up these tumors:

"(a) The tumor originates from the connective tissues through the phenomenon of anaplasia.

"(b) The tumor originates through abnormal vegetative activities of the lymphocytes in the lymph nodes and other lymphoid deposits in the various tissues of the body. If from the lymph nodes, through continuous multiplication of the lymphocytes until their architecture is destroyed, and the capsule being penetrated by the invading cells, widespread infiltration of the surrounding tissues occurs. If from other lymphoid deposits, not definitely collected in nodes, through continuous and infiltrative growth.

"(c) The tumor originates from lymphoblasts, that is, from the undifferentiated cells of the germ centers of the lymph nodes. If these cells multiply rapidly and without differentiation, there results a tumor composed of small polyhedral cells separated by a delicate fibrillar stroma and blood vessels; if they differentiate, a tumor composed of lymphocytes.

"(d) The tumor originates from embryonal residual cells."

According to Ewing, lymphosarcoma represents a lawless proliferation of the cells of the reticulum and their derivatives, which may be attributed to any irritant which influences these unstable cells over a considerable length of time or in a specific manner. Although evidence has been produced to show that tuberculosis is the etiologic factor in certain cases of lymphosarcoma, the point cannot be accepted as proved. It has been shown that tuberculosis and lymphosarcoma may exist simultaneously; the bacillus of tuberculosis has been found in lymphosarcomatous growths and occasionally lymphosarcoma may be similar to, if not undistinguishable from, certain of the infectious granulomas occurring in the gastro-intestinal tract, such as hyperplastic tuberculosis.

In a series of cases of lymphosarcoma of the colon and rectum two cases of chronic ulcerative colitis were noted in which a malignant tumor developed subsequently; in both cases this proved to be lymphosarcoma. These two cases have been reported by Bargen. In one of them a diagnosis of chronic ulcerative colitis had been made at The Mayo Clinic two years before the time the patient returned complaining of a tumor in the right lower part of the abdomen. The

tumor was resected and there were no signs of recurrence one year later, although symptoms of the original infection persisted. The other patient came to the clinic with a typical history of ulcerative colitis; this was corroborated by proctoscopic and roentgen-ray examination.

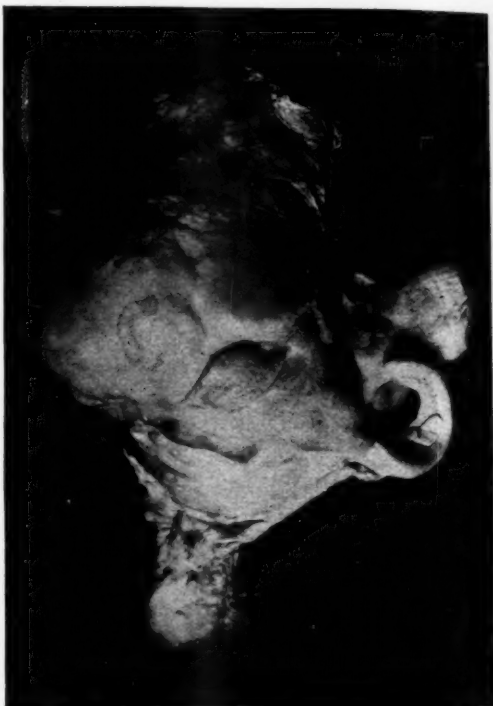


Fig. 1. Posterior surface of large lymphosarcoma of cecum.

Roentgen-ray examination of the colon, however, in addition to the picture of ulcerative colitis, showed an obstructive lesion in the descending colon which was thought to be inflammatory. The patient's general condition was very poor and after a period of medical treatment colostomy was made in the transverse colon to relieve the obstruction which was present. The abdomen was not explored because of the patient's poor condition and the infection in the colon. The patient died eighteen months later and post-mortem examination revealed generalized lymphosarcoma of the Hodgkin's type. One other case in the series presented roentgenologic evidence of healed pulmonary tuberculosis, but in none of the other cases of the series was it possible to find evidence of infection, toxemia, or other form of irritation which might have

served as an etiologic factor in the development of lymphosarcoma.

If infection, chronic irritation or toxemia is significant in the etiology of lymphosarcoma, it seems that this type of tumor would develop more often in the patient suffering from chronic

was thought to be an inflammatory lesion of the colon but which later proved to be a lymphosarcoma.

It is difficult to state the incidence with any degree of accuracy. The disease apparently is rare and a series of cases representative of this



Fig. 2. Very large lymphosarcoma of cecum on section.

ulcerative colitis, a disease in which not only all three of these factors are present at the same time but a large amount of lymphoid tissue is exposed to their action over a long period of time.

A search of the records at The Mayo Clinic revealed eighteen proved cases of lymphosarcoma of the colon and rectum; they were studied clinically and pathologically. Two of the cases have been reported by Bargaen and one case has been reported by Swan. In fifteen of the cases the segment of the bowel containing the tumor was resected. In one case abdominal exploration and biopsy of the tumor was made. In another case the tumor was found on proctoscopic examination and biopsy was carried out. The other case was one which has already been mentioned in which colostomy was done for what

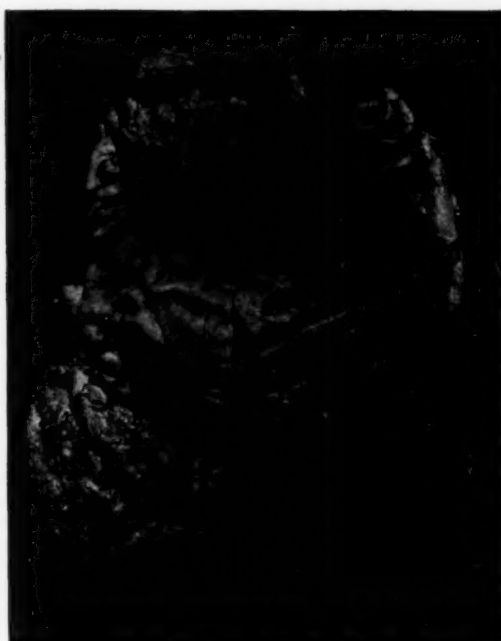


Fig. 3. Polypoid lymphosarcoma of the rectum.

portion of the gastro-intestinal tract alone has not heretofore been published. On the other hand, these tumors may be more common than is suspected, owing to the fact that a diagnosis of lymphosarcoma can seldom be made previous to exploration or necropsy, and again some of these tumors no doubt pass for inoperable carcinoma on account of their large size and the poor physical condition of the patients.

Lymphosarcoma has been found in every segment of the gastro-intestinal tract but is supposed to be most common in the stomach and lower part of the ileum. Broders and Mahle reported a series of twelve cases of lymphosarcoma of the stomach and were able to find only one other series as large as theirs. They reported the incidence in this situation as compared with carcinoma as 1:68.

Bull stated that the incidence in the small intestine as compared with carcinoma is about

1:20. It is well known, however, that the occurrence of any form of primary malignancy of this portion of the intestine is unusual. Nothnagel reviewed nine cases of lymphosarcoma in which the lesions were situated as follows: duodenum, one; jejunum, three; ileum, three; and cecum,

occurs about twice as commonly in males as in females. In this series, thirteen were males and five females. The average age was forty-five and four-tenths years. The youngest patient was aged eleven years and the oldest seventy. Only three of the patients were less than thirty

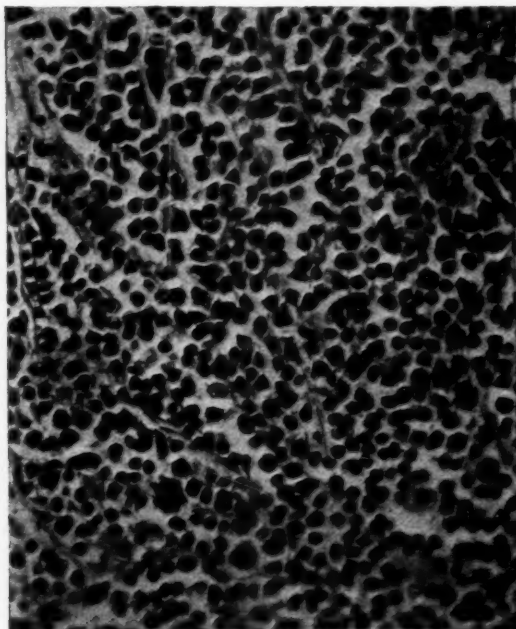


Fig. 4. Diffuse growth of tumor cells in scanty reticulum.

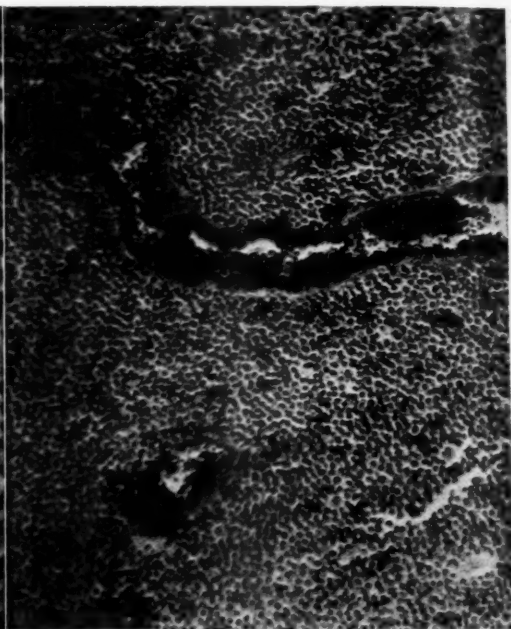


Fig. 5. Diffuse growth of tumor cells. Section from tumor shown in Figure 3.

two. Kruger-Boas found thirty-seven cases of sarcoma in which the lesions were situated as follows: small intestine, sixteen; ileum and cecum, one; cecum, two; appendix, one; transverse colon, one; small and large intestine, one; and rectum, sixteen. From the latter group the erroneous idea has been obtained that lymphosarcoma occurs commonly in the rectum, but the group is made up of all types of sarcoma and the exact number of cases of lymphosarcoma was not stated. Siegel reviewed thirty-four cases of sarcoma of the gastro-intestinal tract and nineteen of these were of the round-cell type. Libman reviewed about fifty-five cases of sarcoma, seventeen of which were of the lymphoid type. In our series of eighteen cases, they were situated as follows: cecum, thirteen; descending colon, one; sigmoid, one; and rectum, three.

SEX AND AGE

Lymphosarcoma, according to the literature,

years and all of these came within the second decade. Goodman reported a case of a large tumor of the sigmoid which occurred in a child aged four years. It would appear, therefore, that lymphosarcoma of the colon and rectum may be found at any age.

SYMPTOMS

Attention has been called to the fact that a clinical diagnosis of primary lymphosarcoma of any segment of the gastro-intestinal tract is rarely if ever made and the true pathologic nature of the tumor is usually revealed at operation or postmortem examination. There are no signs or symptoms that can be depended on to distinguish these tumors from the more common tumors found in the colon and rectum. The most common symptom in our series was abdominal pain, usually cramping in character but never excruciating. Loss of weight was a constant com-

plaint, the average loss being 17 pounds. Five patients had passed blood from the bowel; two of these had growths in the colon and three in the rectum. Pallor was the cause of registration of three patients. Symptoms of obstruction were complained of by three patients. Six pa-

made and at operation the growth had perforated the wall of the cecum and an abscess was present. In none of the cases in the series was the diagnosis of lymphosarcoma made before tissue from the tumor had been studied microscopically. The average duration of symptoms,

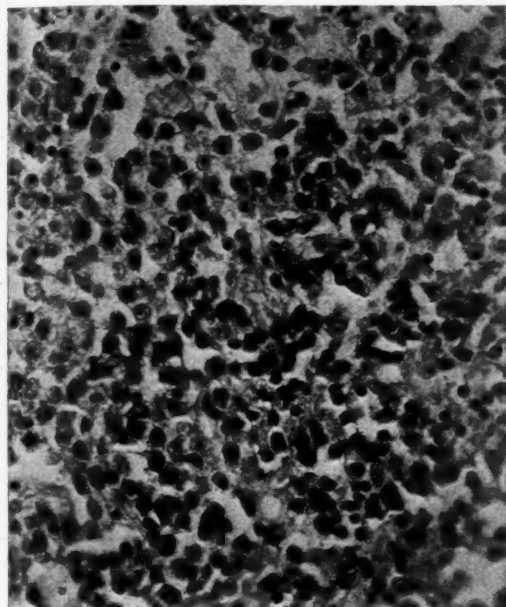


Fig. 6. Section from lymphosarcoma showing tumor cells and lymphocytes. Section from tumors shown in Figure 1.

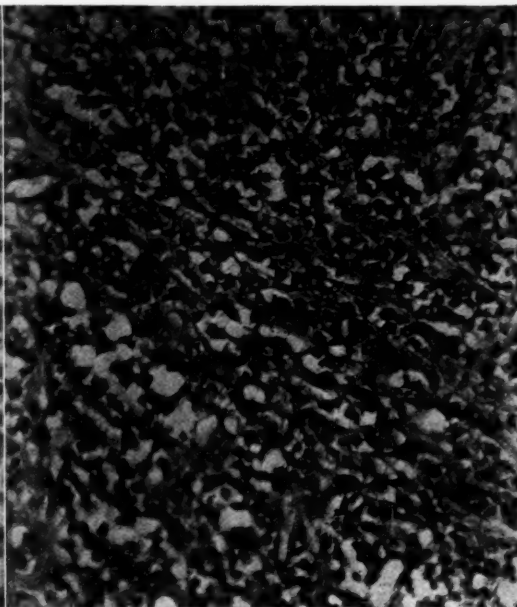


Fig. 7. Section showing tumor cells and abundant reticular tissue. Section from tumor shown in Figure 2.

tients had felt a tumor in the abdomen and in two of these cases symptoms did not precede the finding of the mass. At the time of examination at the clinic a tumor was palpated in fifteen of the cases, including the rectal tumors. The tumor in one case was very large; in another case it was about 10 cm. in diameter. The colon was examined roentgenologically in ten cases in which the tumor was found at operation. In six of these a filling defect was demonstrated; in two the tumor was thought to be extrinsic and in one case the report was negative. The average hemoglobin estimation was 63.5 per cent, the lowest reading being 40 per cent. The average erythrocyte count was 3,570,000. Slight leukocytosis was present in most cases, the average leukocyte count being 11,700. Otherwise changes in the blood were not noted. One patient had fever, leukocytosis and a mass in the cecum; a diagnosis of appendiceal abscess was

excluding the two cases of chronic ulcerative colitis, was five and three-tenths months.

PATHOLOGY

In the majority of cases the gross appearance of the tumors which were removed at operation was that of diffuse infiltration of the wall of the intestine, with or without ulceration of the mucous membrane. The growths occurring in the cecum were usually large, nodular and irregular, and when viewed from the peritoneal surface appeared to be restrained only by the serous coat of the bowel (Fig. 1). As has been mentioned, some of these tumors were very large (Fig. 2). On section the tumors presented a smooth, homogeneous, compact appearance and replaced the entire bowel wall from the serosa to the mucosa in case the latter was not ulcerated. If the mucosa was still intact, it appeared as thickened and raised folds. The lumen was not always en-

croached on. In one of the cases reported by Bargen, the tumor was small but presented a deep excavated ulcer when viewed from the mucosal side. In one case the growth had extended through all coats of the bowel, resulting in perforation and the formation of abscess. In three cases the tumor resected consisted of a large polypoid mass projecting into the lumen of the bowel (Fig. 3). Two of these were rectal growths and in one of them two lymphosarcomatous polyps were found. The regional lymph nodes were involved in eleven of the fifteen cases in which operation was performed. In one patient who died from the operation, postmortem examination revealed a metastatic lesion in the right kidney.

Microscopically, a lymphosarcoma consists of a diffuse growth of lymphoid cells lying in reticular tissue (Figs. 4 and 5). The structure of the affected lymph nodes and follicles is obliterated. The tumor cells vary in size. The nuclei may be either compact or vesicular and are hyperchromatic; mitotic figures are usually abundant. Small lymphocytes may be present in large number (Fig. 6). DeNoyelles found that the predominant cell in his cases was of the size of the transitional leukocyte of the blood and it contained a lobulated or horseshoe-shaped nucleus. In two cases of this series the lymphoid cells were large; epithelioid cells and a few eosinophiles were present and, except for the absence of giant cells, were very much like those in Hodgkin's disease. In some of the tumors the reticulum is hardly to be recognized and the section appears as a homogeneous mass of cells. On the other hand, the stroma is abundant, appearing either as firm, fibrillar strands between which the cells lie, or it consists of rather coarse interlacing bands of connective tissue (Fig. 7). There are small, thin-walled blood vessels or lymph spaces in some of the sections and the tumor cells may be within the lumen of these vessels.

TREATMENT AND RESULTS

In the fifteen cases in this series in which resection was carried out, four patients died from the operation. Five others are known to have had recurrence and four of these are dead but the fifth was living at the last report. The

average length of life of the patients who died of recurrence was eleven and a half months. Six patients are living and apparently in good health, but only two of these have lived long enough since the resection for even the suggestion that they are cured. One of the patients has lived four years and the other three years, without any evidence of recurrence. In one case only exploration and biopsy were done and roentgen-ray treatment was given for a large inoperable tumor. The patient appeared to be well two years later and reported that the tumor had disappeared; however, he was continuing to receive roentgen-ray treatment. In the case in which the growth was situated in the rectum and only a biopsy done and then roentgen-ray and radium treatment given, the patient improved little if any, but is living about four months since the diagnosis was made. One other patient lived eighteen months without treatment other than colostomy, as the tumor was thought to be inflammatory until the postmortem examination revealed its true pathologic nature. Two of the patients who died from recurrence had generalized lymphosarcomatosis.

The regional lymph nodes were involved in eleven of the fifteen cases in which resection was made. Four of the patients died from the operation and four have since died from recurrence. The other three are well as far as we are able to state at this time. Of the four cases in which lymphatic glands were not found to be involved, recurrence has occurred in only one case and was limited to the operative site at the time the diagnosis was made.

We are unable to state the value of roentgen-ray treatment in lymphosarcoma of the colon and rectum. It is usually thought that lymphosarcomatous tumors in general are susceptible to roentgen rays and may be held in check and sometimes cured by this form of treatment. Seven of the patients in the series on whom resection was performed received roentgen-ray treatment after operation. Three of these died from recurrence. One patient did not receive roentgen-ray treatment until recurrence was evident but its use since has apparently held the process in check. As we have stated, roentgen-ray treatment caused the disappearance of a large cecal tumor with involved lymph nodes, and there was no sign of recurrence two years later.

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MEDICAL ENGLISH

What is that which first strikes us, and strikes us at once, in an educated man; and which, among men of education, so instantly distinguishes the man of superior mind, that "we cannot stand under the same archway during a shower of rain without finding him out?"—S. T. Coleridge (1772-1834), *The Conversation of an Educated Man*.

When I was a member of the John Temple Graves Literary Society at the Statesboro High School we had, in addition to the usual officers, a special officer whom we called the "Critic." The "Critic" attended all meetings with note book in hand and immediately wrote down all errors in the use of English which were made by any of the speakers. At the end of each meeting he reported all mistakes which he had observed and at the same time gave the names of the speakers who had made them.

Having often thought that such an officer would find work to do at many of our medical gatherings and desiring to test out the idea, I have, during the past few weeks, jotted down some of our most glaring blunders. The following are typical examples: "Acute appendix," "chronic sinus"; "operated an appendix," "operated a gallbladder," "operated a case"; "typhoid serum," "cold serum," "flu serum"; "shots of insulin," "shots of 606," "shots" of this and that; "good kidneys," "bad kidneys," "bad liver"; "temperature" for

fever; "tubercular" for tuberculous; "proven" for proved.

A patient may have "acute appendicitis," an "acute abdominal condition" or a "chronic sinusitis"; but we have no more excuse for using the terms "acute appendix," "acute abdomen" and "chronic sinus" than we have for "acute foot," "acute face" or "chronic heel." I have operated a cotton gin but cannot understand how some of our skillful surgeons "operate a case" or "operate an appendix." We use the words "vaccine" and "serum" so carelessly that it is impossible for even an intelligent druggist to correctly interpret an oral order for either without detailed explanation. The use of the word "shot" to signify the subcutaneous, intramuscular or intravenous administration of any substance is the lowest of slang.

What is the cause and what is the remedy for this laxity? Teachers and so-called leaders are careless with both the spoken and the written word. Students, interns and young physicians imitate their elders. Just because a "great" surgeon or internist "gets away with it" when he "murders the King's English" does not add luster to his fame. The remedy is a perfectly frank criticism of our practices and a more frequent use of the dictionary. The publications of the American Medical Association are models of correct English—this is particularly true of *The Journal* which is the best edited medical publication in the world.—Allen H. Bunce, M.D., *Fulton County Medical Bulletin*, Atlanta, Ga., March 21, 1929.

EMBOLECTOMY*

With report of a case of removal of an embolus from the brachial artery.

F. H. WIESE, M.D., F.A.C.S.

Minneapolis

THE operation of arteriotomy with extraction of an embolus is a comparatively new operation. Although it had been attempted several times before (the first case on record is that of Ssabanejew, 1895), the first embolectomy with good result was performed in 1911 by Labey. In the following year (1912) Key performed the operation in the first of the eight cases which formed the basis of his excellent article in *Acta Scandinavica Chirurgica* in 1922. In this article, he reports his own cases in detail, also giving a review of the literature on this subject up to that time. His report concerned forty-five known cases with good results in thirteen. Nystrom (1926) gave the total number of cases as being seventy-four with good result in twenty-seven. In all there are now (1927) at least 100 cases on record with successful removal of the embolus in more than one-third of them; but the operation has undoubtedly been performed in a number of cases that never have been published—most likely because of the unsatisfactory results.

It would seem that the Scandinavian countries, especially Sweden, have taken the lead in this field of surgery. In the city and state hospitals of the larger cities in these countries the operation has been performed quite often during the last ten years, and the general practitioners send their cases to the surgeon the moment the diagnosis has been made, not hoping for the re-establishment of the circulation through the mere institution of conservative methods. In the American literature there are comparatively few cases on record, but also here it probably holds true that the operation has been done more often than reported.

The operation concerns mainly the arteries to the extremities. It has also been tried in some cases of pulmonary embolism—the so-called Trendelenburg's operation. But in these cases the operation would naturally have a very limited use, mainly, of course, because of the seri-

ous condition of the patient, and the operation requiring more than the average technical skill and speed. Besides, most of the patients who would need the operation die in such a short time that it could seldom be performed early enough. Of late, however (1927), there have been reported a few (4?) cases with good results from this attempt at extraction of a pulmonary embolus through an incision in the main pulmonary artery; two of these operations were performed in Sweden quite recently.

ETIOLOGY

The origin of embolism in the main arteries of the extremities is a cardiac or in a few cases an aortic thrombosis (atheromatous patch, aneurismal sac). Most often the underlying cause is a mitral lesion or a myocarditis. In some cases there have been no symptoms or findings of a heart lesion, which probably has been present but not diagnosed.

The occurrence of embolism after operations or during or after infectious diseases has been thought due to an acute myocarditis with thrombi in the heart. In one case (Hellstrom), a twelve year old boy (a severe case of diphtheria treated with large doses of serum), the question arose as to whether or not the serum was the cause of the thrombus found in the heart at the autopsy.

After the use of quinidin in heart cases there have been some reports of sudden death due to cerebral or pulmonary embolism, although this tendency of embolism to occur following the cessation of auricular fibrillation also was noted before quinidin was used (dislodgment of thrombi on resumption of normal auricular activity). (Wilson Hermann, Ann Arbor.)

In cases of patent foramen ovale of the heart an embolism in the arteries of the extremities can be due to a thrombophlebitis of the systemic veins, a so-called paradoxical arterial embolism. Nystrom reported a case of this type, in which operation was performed for emboli of both iliac arteries, at autopsy showing thrombosis of the

*Read before the Minneapolis Surgical Society, February 2, 1928.

right femoral and iliac veins and an open foramen ovale (also pulmonary and cerebral emboli).

The cases of peripheral embolism, in which operation was performed, seem to be fairly evenly divided between the sexes. Most of the reported cases occur in middle age (thirty-one to sixty-five). Some of the oldest patients operated upon were eighty-two and seventy-eight years old, both with good result (Torell, Michaelson); the youngest, the above mentioned boy of twelve. Key mentions also two other patients under twenty years of age, and several between twenty and thirty.

LOCALIZATION OF THE PERIPHERAL EMBOLI

As a rule the emboli are arrested at the division of a vessel, where the larger arterial branches leave the main artery. There are many more cases on record of operation on the lower extremities than on the arteries to the arms. From Key's statistics the left leg and especially the left arm seem more often affected than the right, although the cases are too few to justify any definite conclusions.

Multiple emboli are quite common and many cases have been reported which had two different embolectomies done at one time.

The arrested embolus will, if left alone, increase in size because of secondary thrombosis, a condition that will naturally tend to produce more complete obstruction and thereby increase the danger of gangrene by blocking part of the collateral circulation.

The thrombus formation takes place mostly toward the periphery, but also to a smaller degree in a proximal direction and varies greatly in different cases. Some cases show extensive secondary thrombosis, as Sundberg's case of embolism in the femoral artery operated twelve hours after onset. The length of embolus with thrombus in this case was 86 cm. In other cases often of considerably longer standing there might be practically no thrombosis; in one of Wideroe's cases, operated eight days after the onset, the embolus was only 1.5 cm. long; in one of Ibsen's cases there was no thrombosis after eleven days. Nicolaysen's case of embolism of the radial and ulnar arteries operated respectively nineteen and twenty-eight days after the onset showed practically none.

At the site of the embolus the intima will suffer, evidenced by the tendency of thrombus for-

mation even after successful removal of the embolus. In regard to the degree of organization of the clot there are great differences. In one case (Nystrom's) the clot was quite adherent after only three and one-half hours standing; in many other cases the embolus was easily loosened from the intima even if the condition had lasted for several days. The vitality of the tissues varies greatly, first, of course, depending on the degree of the obstruction, but also showing considerable individual differences (age, etc.).

The importance of early operation is evident. An embolectomy will almost surely prove a failure after twenty-four hours of total obstruction as far as complete restoration of circulation is concerned. Good results can be looked for if the patient is operated within ten or preferably within five hours after the onset.

Naturally the question will arise—how well will the collateral circulation take care of the affected limb in the different cases without operation? The danger of gangrene would be greater than that following simple ligation of the different arteries, partly because of the secondary thrombosis that might interfere considerably with the collateral circulation, and partly because these patients with emboli often are more or less debilitated and in a generally poor state of nutrition.

The percentages of gangrene after ligation of the main arteries to the extremities (after Wolf, quoted by Key) are:

	Per cent
Art. iliaca communis.....	50
Art. femoralis communis.....	25
Art. poplitea	15
Art. axillaris	15
Art. brachialis	4.8

Experience has shown that these figures would be considerably higher in cases of embolism.

SYMPTOMS

The symptoms of embolism in the main peripheral arteries vary greatly according to the degree of obstruction of the vessel in the different cases, the age of the patient, the condition of the vessels and the heart, blood pressure, and the anatomical possibilities of an early established collateral circulation.

In two cases of embolus in exactly the same location one can thus find considerable differ-

ence in the degree of circulatory disturbances and the other symptoms.

In some cases the onset is preceded by prodromes in the form of short-lasting indefinite pain in the same extremity, sometimes in one of the other limbs, this pain very likely being due to a smaller, otherwise not diagnosed embolus. Or there might previously have been signs of smaller emboli to kidney, lungs, or brain (kidney colic, bloody expectoration, or symptoms from the central nervous system). In some cases there are symptoms of successive stops in the arterial tree before the embolus is finally arrested.

The onset is usually quite sudden, but in many cases more gradual, namely, when there is only a partial occlusion of the vessel. The suddenness of onset seems to bear a greater risk of gangrene, since in the cases of more gradual beginning the adaptation to the new circulatory condition can take place more slowly and there is more time and chance for the development of the collateral circulation.

Pain is a constant symptom and is usually sudden in onset and often so severe that the operation of removal of the embolus sometimes would seem indicated for this reason alone. A greater or lesser part of the limb feels cold and numb and loses its strength and power. The disturbance of the skin sensibility varies considerably, is usually pronounced in the more distal areas, gradually disappearing in a proximal direction.

The objective symptoms will naturally be most marked in the distal parts. The color of the skin is pale, sometimes somewhat cyanotic or showing dark blotches. The temperature of the skin is low. The motility of the limb is diminished or partly abolished; but often seems to be more or less preserved in parts that otherwise suffer definitely from the circulatory disturbances. Skin and tendon reflexes are absent.

The embolus itself can sometimes be palpated as a cord-like structure in patients who are not very fleshy and in certain locations, especially in the upper femoral, the brachial and the lower part of the axillary arteries. The pulsation in the artery distal to the embolus is either totally absent or very feeble.

The tenderness to pressure at the site of the embolus has been pointed out as an important symptom (Alman).

The danger of gangrene depends mainly upon the degree of obstruction of the lumen of the vessel according to the size of the embolus and the secondary thrombi, and on the development of collateral circulation. If gangrene sets in, it is a dry gangrene beginning in the most distal parts, extending gradually higher and higher.

As the collateral circulation will take care of the blood supply to at least a part of the affected area, the embolus will, as Key has pointed out, always be found higher up than the upper border of the circulatory disturbances.

In some cases this border may change; if the circulatory disturbances spread upward it is due to a more complete obstruction or blocking of the collaterals from secondary thrombosis or due to another embolus higher up. One of Key's cases showed symptoms of an embolus in the popliteal artery which was soon followed by signs of an embolus in the arteria femoralis communis. If the upper border moves in a distal direction it would probably mean that the embolus has come loose and moved with the blood stream. Torrell reports a case where the changes of the symptoms seemed to indicate successive stops at different locations (arch of the aorta, bifurcation of the aorta and finally the left femoral artery). The blood pressure will be a factor in determining how far the embolus will move distally.

In locating the embolus in the different arteries one should remember the locations that tend to arrest the emboli, namely, the places where the arteries divide.

The cessation of the pulsation in the arteries is of course of high diagnostic value. The extension of the circulatory disturbance proximally will, in general, be a help in locating the site of the embolus, which always will be found proximal to this upper border. In this respect, however, there seems to be a few variations, depending upon the different degrees of occlusion of the lumen of the vessel and the different development and anatomical variations of the collaterals in each case. An embolus in the femoral artery might thus in some cases give more extensive circulatory disturbances than an embolus in the common iliac artery.

An embolus at the bifurcation of the aorta will usually produce marked circulatory disturbances in all or almost all portions of both legs, sometimes also in the lower part of the abdomen.

Pain in the anal region is often a symptom.

Considerable variations in the picture will occur because of the different degrees of obstruction of the two branches, an embolus at the bifurcation sometimes obstructing only one of these and thus giving symptoms from only one leg.

Emboli in the common iliac artery usually show disturbed circulation extending above the middle of the thigh. In cases of bilateral embolism in the common iliac arteries the picture is practically the same as an embolism at the bifurcation of the aorta.

Circulatory disturbances including the lower third of the thigh, the knee, or extending to just below the knee, point to an embolus in the common femoral artery; pulsation of the artery can in these cases usually be felt at Poupart's ligament. In cases of embolus in the popliteal artery only the foot and the lower third to half of the leg (*crus*) will suffer from circulatory changes.

The main sites of emboli in the upper extremities are the axillary and the upper part of the brachial artery; the circulatory disturbances in both cases are found in the hand and a greater or smaller part of the forearm and are so much alike that they can hardly be distinguished from each other. Pulsation can be felt high in the axilla in most cases. Sometimes the embolus can be directly palpated and tenderness to pressure over the embolus is often present.

The diagnosis of peripheral embolism in typical cases is easy, especially with sudden onset, and when the embolus is comparatively large.

In cases with less pronounced symptoms and, with only partial obstruction of the lumen of the vessel, the diagnosis is more difficult. Early, vague symptoms can be mistaken for paresthesias (as in a case of Michaelsson's).

With more marked circulatory disturbances one has to consider in the differential diagnosis thrombosis of the artery due to arteritis. Sudden onset, preexisting cardiac disease, recent operation or infectious disease would make the diagnosis of embolism most likely. In arteritic thrombosis the patient usually has had prodromes for a long time, often years, such as the feeling of cold, numbness, neuralgic pain, and cyanosis. Arteriosclerosis predisposes to thrombosis and must be considered.

Another condition that can give symptoms very similar to those of embolism is angiospasm. J. Holst mentions a patient he operated upon for

embolus of the femoral artery having given all the typical symptoms of this condition, but found instead a marked spasm of the femoral and popliteal arteries, did a periarterial sympathectomy, and the patient became symptom-free.

Thrombophlebitis with venous thrombosis has been mistaken for embolism in some cases. In this condition, however, the limb is warm, cyanotic and swollen, the sensibility not changed, the pulse can usually be felt and the cord-like, tender vein palpated.

A direct local trauma can sometimes result in a thrombosis of the artery. The history will in such a case give the diagnosis.

In embolism at the bifurcation of the aorta, the diagnosis of acute myelitis or hematomyelia might be made, but the typical circulatory disturbances in emboli cases would decide.

The occurrence of two or more emboli at one time is quite common and almost to be expected, considering the cause and the origin of this condition. In Key's first series of eight cases, multiple peripheral emboli occurred in five, two emboli having to be removed from the same extremity.

The indications for operation in cases of embolism of the main arteries to the extremities should be wide, according to most authors' opinion, these patients having much to gain and very little to lose in being operated upon. The danger of gangrene is great because of secondary thrombosis, and cases of embolism of the bifurcation of the aorta, of the iliac artery, the femoral, popliteal, axillary, and upper part of the brachial arteries should be operated upon as early as possible, if there is no contraindication because of poor general condition, or marked arteriosclerosis.

The shock from the operation is diminutive, and while many of these patients seem to be serious risks they stand the operation remarkably well. Even if the patient seems to be in poor condition, the relief from the severe pain and the prevention of the much more serious operation of an amputation, if gangrene should set in, are indications enough for embolectomy. Soderlund reports a patient with embolism and no gangrene, who was not operated upon, but had considerable pain for at least fourteen days, besides showing a certain degree of paralysis and contracture of the muscles, making the arm unfit for work for several weeks. Nystrom reported a patient who

was seen five days after the onset. No gangrene having set in, the embolus most likely being very adherent and showing secondary thrombi, he decided not to operate, hoping for the return of the circulation. However, a few days later gangrene developed, and an amputation was necessary. Also in some cases of beginning gangrene Key has found the operation worth while, as the line of demarcation by the improved circulation can be moved further distally and consequently the amputation made less extensive. Other authors have suggested ligation of the vessels in these cases of beginning gangrene proximal to the embolus in order to avoid central extension of the secondary thrombosis.

The operation of embolectomy should be performed in local anesthesia if possible. Only in instances where a laparotomy for embolism at the bifurcation of the aorta or the common iliac artery has been decided upon a general anesthesia might be needed.

Incision and approach to the vessel are made, if possible, right over the embolus. After the artery has been exposed, it is (according to Key's suggestion) surrounded with sponges soaked in 2 per cent sodium citrate solution in the hope of preventing any coagulation of blood in the field of the operation. Likewise are the instruments and the surgeon's gloves frequently rinsed in the same solution. A soft arterial clamp is applied to the artery on the proximal side of the embolus; if there should be much bleeding after the artery has been opened it might also be desirable to put clamps on the main-branches (f. inst. profunda femoral or prof. brachial arteries) or on the main artery distal to the embolus (back-bleeding from the periphery).

The artery is opened, if possible, just above or below the embolus, where the intima will be intact and have less tendency to secondary thrombi formation.

If not adherent, the embolus then often will escape without any further manipulation, or slight pressure over the embolus will milk it out of the opening.

If the embolus is adherent to the intima or the incision in the artery has been made below the embolus or in order to deal with secondary thrombi, it might be necessary to use fine probes, scoops or tissue-forceps to loosen or remove the clots. The artery is cleaned out as thoroughly as possible under the circumstances, some authors

even having advised irrigation of the lumen through multiple incisions.

Before suturing of the opening the proximal clamp is loosened for a second, so that small pieces of clots that might have been left can escape with the blood stream through the arteriotomy wound; a clamp on the distal side will during this maneuver prevent debris from passing into the vessel below the incision.

The latter is then sutured, fine vaselinated needles and finest vaselinated silk being used; the suture is either continuous or interrupted, including only adventitia and media, carefully avoiding the intima.

Repeatedly it has been necessary to re-open the incision in the artery and remove clots that either might have been overlooked or might have reformed after the closure (thrombi).

Since multiple emboli are a frequent occurrence one should, after the removal of an embolus, make sure that the circulation is restored; if this is not the case, examination might reveal another embolus that should be removed at once, if found in a large vessel.

In more central locations, where it is difficult to approach the part of the vessel containing the embolus, Key advises incision of the artery at a lower point, where the artery is easily reached, and retrograde probing, thereby breaking up the clots and letting the pieces escape with the blood stream. For this purpose an instrument like Babcock's probe for operation for varicose veins (a ball-like round end on a very flexible probe) has been recommended. This method should probably be followed in operations for emboli of the upper part of axillary or of the subclavian arteries.

In embolism of the bifurcation of the aorta, of the common iliac artery, and the upper portion of the external iliac, a laparotomy would give the most direct approach to the embolus; but this being a serious operation for these patients Key advises incision of the femoral artery and retrograde probing as the standard method in these cases. The degree of central bleeding on opening the femoral artery might then give information as to the real site of the embolus (Perman). If the bifurcation of the aorta is the location, there will be considerable central bleeding from the immediate collateral circulation through the hypogastric artery, but very little

central bleeding if there is an embolus at the bifurcation of the common iliac artery.

If the bifurcation of the aorta is the site of the embolus, it seems necessary in most cases to probe from incisions in the femoral artery on both sides.

The danger of this retrograde probing has been pointed out by Nystrom, who reports a case of marked arteriosclerosis, where the probing caused a tear in the intima with a resulting false passage.

Nystrom advises, for certain cases of iliac embolism, retroperitoneal massage from an inguinal incision, causing mobilization of the embolus or its pieces and removal with the blood stream through an incision in the femoral artery.

Other ways of dealing with embolism to the extremities can be mentioned briefly, as they are all of minor importance, compared to the method of embolectomy.

Several cases have been reported, in which an effort was made to break up the embolus by external massage without incision (Embolotripsy), in the hope that the dislodged debris would follow the blood stream to places of less importance from the standpoint of circulation. Some of these attempts have undoubtedly been successful, and Key finds the method indicated in certain cases of embolism, especially in patients in poor general condition, with weak heart or marked arteriosclerosis, or in patients living in localities where it would take too long to get to a hospital and surgical help.

Other authors warn against the method, considering it not only unreliable but also sometimes making conditions worse than before.

If removal of the embolus and thrombi during the attempted embolectomy seems impossible, the artery should be ligated proximal to the embolus to prevent further thrombosis.

An antero-venous anastomosis has been made in some of these cases,—with very questionable results. The same holds true for the operation of resection of the vessel with direct end-to-end anastomosis (Stewart), or resection of the artery with transplantation of a section of a vein.

RESULT OF THE OPERATION

If the embolectomy has been successful, the symptoms disappear more or less completely; the pain often ceases immediately, the extremity will soon feel warmer and the normal color gradually return. The improvement in the skin-

sensibility is slower, but often finally complete. Pulsation is sometimes felt strongly at once after the removal of the embolus, but in other cases that still may give good functional result (Henney, Snyder, Hayer) this does not occur.

Repeatedly, marked improvement of the patient's general condition has been noticed, and also in the heart action itself.

PROGNOSIS

The prognosis after embolectomy is always doubtful both *quoad vitam* and for the extremity itself.

Many of these patients with marked cardiac lesions will soon succumb to this original disease. In this regard the best prognosis is to be expected in cases where the embolism occurs after some acute infectious disease or after operations. In these cases the damage to the heart is less permanent, even if there also are found thrombi in the heart.

Next there is always the danger of repeated embolism, either to the extremities, or to the lungs, brain, heart or kidneys.

In my case the recovery was complicated by showers of small emboli to different places in the brain, starting in on the fifth post-operative day, at first producing symptoms only for a few days, later causing more permanent injury, namely a total left-sided hemiplegia (the unoperated side).

The prognosis for the extremity itself will naturally depend upon the time elapsed between the onset of the embolism and the removal of the clot, the site of the embolus, the chances for established collateral circulation, the condition of the arteries, eventual multiplicity of emboli, the patient's general condition, age, and vitality of the tissues.

The importance of early operation is evident from Key's figures:

12 cases, operation within 10 hours:	
Good result in	9
5 cases, operation within 11-15 hours:	
Good result in	2
3 cases, operation within 16-20 hours:	
Good result in	1
4 cases, operation within 21-24 hours:	
Good result in	1

The latter case (Key's own 8th case) was operated upon twenty-two and a half hours after

onset, the longest time on record having elapsed between onset and removal of embolus with complete restoration of the circulation. It is probable that in the late successful cases already reported, complete and absolute obstruction has not been present quite so long as would appear, but that a collateral circulation in reality saved the limb.*

In spite of all the dangers that threaten these patients many of them have been reported to have lived comfortably for several years, some of them even having gone back to their former work.

CASE REPORT

The patient was a married woman sixty-four years old. She had had four children and one miscarriage. Menopause occurred in 1915. As a child she had had measles, diphtheria and rheumatic fever, that was supposed to have been followed by leakage of the heart. In 1910 and 1912 she again had articular rheumatism. In the spring of 1920 she was treated for hypertension. Blood pressure at that time was as high as 280, under treatment coming down to 210.

In April, 1926, she was in the hospital for three weeks, being treated for hypertension and a decompensating heart with auricular fibrillation. The dyspnea was very marked, and an electrocardiogram showed definite myocardial disease. Blood pressure at this time was 180/100. No liver enlargement and no edema were present.

During the summer and fall of 1926 she got along fairly well, being up and about every day and taking digifolin off and on without having any medical attention.

At Thanksgiving time the compensation of her heart again broke down, she developed generalized edema, marked dyspnea, and an enlarged liver. Diagnosis at that time was probable mitral stenosis. She was treated in her home and again responded quite well to treatment. During this period she complained a few times of sharp pain in her left foot and leg without showing any circulatory disturbance however, and no definite diagnosis was made. This pain might have been due to smaller emboli giving no other symptoms.

On February 1, 1927, when awakening in the morning, she had a severe pain in the right arm, which also became pale and cold and could not be moved. She suffered all day without sending for a doctor. When I saw her between 6 and 7 p. m., the right hand, forearm, and distal third of the upper arm were pale, slightly bluish in places and cold to touch. She then had considerable pain in the arm; the hand felt numb, and the skin sensibility was absent in fingers, hand, and for three finger breadths' distance above the wrist. Active motility of the right hand and fingers was almost entirely abolished. No pulsation was felt in the radial, ulnar or brachial arteries. High in the axilla strong

pulsation was noticed. The general condition of the patient otherwise was fair.

Diagnosis was made of embolus in the upper part of right brachial or lower part of axillary artery, and the patient was sent to the hospital for operation. The operation could not be started until 10:40 p. m., probably at least fourteen hours after the onset of symptoms.

Under local anesthesia a longitudinal incision was made over the upper part of the right brachial artery, about three inches long. The artery was here found not pulsating, firm, and evidently filled with a thrombotic mass, extending upwards to about one-half inch above the point of division, where the profunda brachial artery begins. No pulsation was present in the latter artery, the clot evidently obstructing the lumen of both main arteries. The pulsating artery proximal to the embolus was temporarily blocked by means of an assistant's fingers. After the artery was surrounded by compresses soaked in 2 per cent sodium citrate solution a small incision was made in the brachial artery at the lower end of the embolus. Some flow of blood from the periphery, but no pulsating blood from above. Another incision was made at the upper end of the clot, just above the place of division of the artery. The upper part of the embolus immediately began to protrude through the incision; not being adherent to the intima the whole embolus, about 4 cm. long, was easily milked upwards and out through the opening in the artery. With the pulsating blood stream that was opened for a second there also escaped through this incision a piece of a clot the size of half a pea, probably having belonged to the upper end of the embolus and become loose when the latter was removed. The upper incision was closed with five interrupted vaselinated silk sutures. The lower incision was next sutured in the same manner, after the free passage of the pulsating blood stream had been ascertained. The wound was found dry and was closed without drainage.

The patient's condition after the operation was comparatively good. There was strong pulsation felt in the lower part of the brachial artery, but none in the radial.

On the following day she had very little pain in the hand, which felt decidedly warmer and was more normal in color. There were still some blue spots on the skin, especially on the inside of the thumb. The finger nails were also blue but she was able to move hand and fingers considerably. The sensibility returned, but more slowly, down to the metacarpo-phalangeal joints on the day after the operation, the fingers still remaining completely anesthetic.

During the next three or four days the condition of her hand and arm improved gradually and markedly; the hand became warm and of good color. On the fourth post-operative day she could move her arm and hand well. The skin sensibility returned more slowly over the proximal part of the fingers. Pulsation was then felt in the ulnar artery and faintly in the radial artery.

The pulse was around 80, quite irregular, but other-

*Geoffrey, Jefferson: Brit. Med. Jour., 1925.

wise of good quality. Her general appearance was good, she was cheerful, talking plainly and had no complaints.

On the morning of the fifth day she showed symptoms of embolism in the left cerebral hemisphere. She was at times more or less stuporous, but seemed to recognize persons. Her speech was inarticulate but there was no paralysis of tongue or face. The right leg was paralyzed, the right arm could be moved a little in the elbow, the right hand looked satisfactory and pulsation was present as on the previous day. The patellar reflexes were present but sluggish. The pupils were equal and reacted normally to light. Some congestion was present at base of both lungs posteriorly. For two or three days involuntary bowel movement and urination occurred. The symptoms of hemiplegia improved markedly and rapidly. Her speech after three days was almost normal; she moved arms and legs well. The right hand continuously looking well. Pulsation in the radial artery was better.

On the eighth day postoperative, the patient was bright and cheerful and had a good appetite.

On the ninth day she again showed signs of another cerebral embolus, speech again inarticulate and this time a definite drop of right eyelid occurred. The muscles of the eyeball showed normal function. The right arm and leg were very little affected. The patient was drowsy, slept much and was irrational at times. Again she improved nicely. On the twelfth day postoperative-

ly, she noticed a definite weakness of the left arm and leg, which during the following weeks gradually developed into a pronounced hemiplegia on this, the non-operated side. The circulation in this arm and leg was seemingly normal; pulsation in all the arteries was good. On the seventeenth day there was noticed a slight left facial paralysis and again some ptosis of the right eyelid. The left arm was then completely paralyzed, while the right, the operated arm, could be moved well and was quite useful. Her speech was fairly good.

During the next month she gradually got weaker, became very restless, and developed Cheyne-Stokes respiration. While the left arm stayed totally paralyzed, the right was seemingly well.

On March 18, she developed a right lower lobar pneumonia and died three days later, seven weeks after operation.

Even though no permanent good could be expected as a result of the operation in this case due to the serious condition of the patient's heart, I feel that the operation was well worth while as it relieved her of quite severe pain, and removed the great danger of gangrene which eventually would have been followed by the considerably more serious operation of an amputation, and it gave her a fairly useful arm during her last weeks when the other arm was totally paralyzed from a cerebral embolism.

PASTEURIZATION

In view of the increased interest in pasteurization due to the adoption of new milk regulations these excerpts from an article by Dr. M. J. Rosenau in the *New England Journal of Medicine*, January 10, 1929, are reprinted for the benefit of our readers. The article in question is based largely on the chapter, "Milk," in Dr. Rosenau's book, "Preventive Medicine and Hygiene," fifth edition.

Milk heated to 145° F. for thirty minutes does not undergo any appreciable physical or chemical change.

Pasteurization prevents sickness and saves lives. Pasteurization is not ideal, but only an expedient. It is advocated because milk is apt to convey the viruses of a number of diseases harmful to man. Pasteurization effectively prevents this hazard. . . . It is the best insurance both for the industry and the consumer and the simplest, cheapest, least objectionable and most trustworthy method of rendering the milk safe. . . .

Pasteurization does not claim to replace sanitation and common decency. . . . Stale, weak and dirty milk is still stale, weak and dirty after it has been pasteurized.

Milk pasteurized at the temperature recommended (142°-145° F.) sours as a result of lactic acid fermentation just as raw milk does, although somewhat more slowly. Nature has no danger signal for infected milk. Milk may be teeming with typhoid bacilli and other pathogenic micro-organisms without its taste, odor or appearance being changed.

None of the important vitamins in milk, Dr. Rosenau

says, excepting Vitamin C, are destroyed by heat. Of this vitamin he says:

The amount of antiscorbutic property, Vitamin C, found in milk depends upon the quantity contained in the feed of the cow. Stall-fed cows in winter furnish a milk almost devoid of antiscorbutic property. Experiments have shown that the temperatures of pasteurization recommended decrease this property in milk about one-half. In any case, cow's milk cannot be depended upon to protect children against scurvy and they should therefore receive orange juice or tomato juice, whether the milk is raw or pasteurized.

The heat of pasteurization does not alter the taste, appearance or digestibility of milk and does not appreciably diminish its food value, except that there may be a diminution of its antiscorbutic property, which in any case should be offset by the use of orange juice or tomato juice. In fact, pasteurization tends to make the curds smaller and in this way perhaps easier to digest.

One objection to pasteurization has always been the claim that it will put back the cause of clean milk and good dairy methods, because pasteurization will make cleanliness unnecessary and will put carelessness at a premium. Experience has proven the fallacy of this argument. In fact, the general milk supply of large cities has steadily and materially improved despite pasteurization.

Pasteurization is not proposed as a substitute for, but as an adjunct to inspection. Inspection gives us cleaner and fresher, but not necessarily safe, milk. Inspectors cannot be present all the time, and furthermore, even if they were Pasteurs, they could not see missed cases and carriers. Pasteurization destroys the dangers inspection cannot see.

Infants should receive breast milk. There is no adequate substitute. When this is not possible, they should have the best and freshest cow's milk that can be obtained. Whether such milk is to be pasteurized, modified, or otherwise treated rests with the pediatrician. Pasteurization has the well-nigh unanimous endorsement of sanitarians and pediatricians.—*Health News*, Mar. 9, 1929.

PENETRATING GUNSHOT WOUNDS OF THE CHEST WITH RESIDUAL FOREIGN BODIES*

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GUNSHOT wounds of the chest are today more frequently encountered in civil life than twenty years ago. This is due to the growing disregard for human life, which is one manifestation of the so-called "crime wave," and to the ignorance and carelessness of persons handling firearms. Years ago there was a slogan, "Shoot 'em in the guts," which permeated gun-fighting society and which has been broadcasted amongst today's bandits, bootleggers and others of that ilk; but the technic which made the old time gunman a sure shot has not been acquired by the newer generation and one result is that the bullet intended for the abdomen too often finds lodgment in the chest. Another factor is the increasing use of the sawed-off shotgun with its load of buckshot or slugs.

In time of war the soldier encountered bullets in profusion, high-explosive shells and shrapnel which sprayed him with small balls and fragments of steel casings, and chest wounds were of common occurrence because of the large percentage of possibilities rather than to individual intent and accuracy of aim.

The purport of this paper is to briefly recount the histories of twenty-five cases of gunshot wounds of the chest with residual foreign bodies, which have come under the personal observation of the writer, and to give vent to some conclusions drawn therefrom and from other experiences with gunshot wounds.

Case 1.—J. J. P., Civil War veteran, received a gunshot wound of the chest in 1864. There was no wound of exit. After recovering from the immediate effects of the wound, he continued to suffer from hemoptysis and some eight years later was diagnosed as having consumption. As a boy I can remember this man and his war history, as he was a local celebrity because of his having a bullet in his lungs. He lived for twenty-five years after receiving his wound and finally died of a hemorrhage from the lungs.

Case 2.—C. R., while trying to escape from the police and engaging in a little gun play, was shot in the chest. Examination at the hospital disclosed no wound of exit. The man suffered from shock, dyspnea and hemoptysis, but rallied and for three days appeared to

be on the road to recovery. Then there suddenly occurred a secondary hemorrhage with a faint outcry, a choking and strangling, an outpouring of blood, and in less than ten seconds the man was dead. At the autopsy it was found the bullet had lodged in apposition to one of the pulmonic veins, bruising the coat of the vessel somewhat, and that the constant friction incident to the respiratory movements had induced an ulceration resulting in a sloughing with perforation of the blood vessel.

Case 3.—A Kossu warrior (Liberia, West Africa), in an internecine pleasantry some years previous, had received a gunshot wound of the chest. The man was an object of wonder and curiosity because of his having a "pipe leading down into his lungs." Through mutual friends he was induced to come to the mission hospital for examination and such treatment as might be deemed necessary. Let me here remark, parenthetically, that this was in 1886, when antisepsis was in its incipency, when x-rays were unknown and the writer was young, hyperenthusiastic and practising in an uncivilized country where the surgeon was venerated as a wonder-worker and where malpractice laws were not. The history given by the man was that he had been shot in a raid upon a native town. At first there had been considerable hemorrhage and some pain, but for several months he had kept perfectly quiet, and these had gradually grown less until at the time he came to the hospital, there was a minimum of each. The treatment, by a native medicine man, had consisted of morning and evening applications of grated paw-paw (*Carica papaya*) melon pulp.

Examination of the man disclosed an opening in the chest wall, just below the right nipple, about half an inch in diameter, and from which, on deep breathing, there exuded a few drops of bloody serum. Careful exploration with a probe demonstrated the existence of a sinus about two inches deep leading directly into the chest cavity and at the bottom of which could be felt a hard gritty substance, evidently a metallic foreign body. It was noted that this foreign body was movable. This exploration was followed by the escape of about a teaspoonful of bloody serum and pus.

The next day the patient was placed under ether, the sinus slightly opened up and the foreign body removed with Tiemans' bullet forceps, the wound was cleansed of clots, mopped out with pledgets of lint wet with 5 per cent carbolized water, wiped as dry as possible, and then loosely packed with lint and iodoform. The foreign body proved to be a "pot-foot." (The natives have a meager supply of lead bullets and in lieu thereof use small fragments of broken iron pots.) The wound was dressed morning and evening with lint and iodoform packing for a few days, then less often until,

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at the end of two weeks, the sinus had entirely healed.

Case 4.—R. S. was wounded in a moonshine raid, receiving part of a load of buckshot in the chest. When examined, at the jail, he was suffering from shock, with hemoptysis, and a small hemothorax, there being a few râles heard in the right chest, and a diagnosis was made of gunshot wounds of the lung with residual buckshot. Several shot were removed from the chest wall and all wounds were dressed antiseptically. No alarming symptoms developed, the hemoptysis lessened and gradually ceased, the wounds healed and apparently no disability resulted from the incident. Some fifteen years later this same man again came under observation and an *x*-ray examination was made which disclosed three buckshot apparently embedded in the right lung and evidently encysted, as they moved with respiration. The man stated he had suffered no inconvenience during the intervening years.

Case 5.—W. C., a Spanish War soldier, had received penetrating gunshot wounds of the chest and had a Mauser bullet lodged in the apex of the right lung, as shown by *x*-ray examination. At the time of the injury he was hospitalized, with shock, hemorrhage from the wound, dyspnea, hemoptysis and slight hemothorax. Absolute rest was carried out, antiseptic dressings were applied and the man treated symptomatically. The immediate symptoms subsided in ten days and at the end of thirty days the man was up and about. For several months thereafter there was an occasional hemoptysis but these attacks became farther apart and less in quantity and eventually ceased entirely. An examination made ten years after the injury showed lung expansion good, free and even, no râles, no hemoptysis, slight bronchitis occasionally and pleuritic pains once in a while, excited by unusual (for him) exertion or climatic conditions. The patient died in 1910 of typhoid fever, an intercurrent disease having no relation whatever to the lung condition, although the latter could be properly regarded as a complication.

Case 6.—J. A. R., in 1906, received a gunshot wound in a display of frontier amenities, the bullet passing through the upper third of the left arm, penetrating the chest wall and lodging under the anterior end of the seventh rib. Under antiseptic treatment the wound healed without complications and the man apparently enjoyed good health for years after. He served during the World War without reporting for sick call, and upon being discharged no defects were noted. On January 8, 1923, during the course of a routine examination, stereoscopic *x*-ray plates of the chest were made and these showed the diaphragm shadows clear on both sides, no evidence of fluid in either chest, heart and aorta normal in size, shape and position, and no evidence of pulmonary pathology. There was a metallic foreign body, apparently a revolver bullet, just under the anterior end of the seventh rib on the left side which did not appear to be in the lung tissue. Inasmuch as the bullet was causing no trouble there was no indication for treatment and it was left undisturbed.

Case 7.—H. J., on October 10, 1917, at the Argonne, received a shrapnel wound of the right chest, the frag-

ment entering in the axillary region. He was treated at various hospitals for several months and finally landed in Base Hospital 24 near Bordeaux. Returned to the U. S. A. March 14, 1919, and through Greenhut Hospital, New York, to Camp Dodge G. H., where he arrived April 1, 1919, and was discharged without any attempt having been made to remove the foreign body. *X*-ray plates made July 20, 1919, and October 21, 1920, showed a metallic foreign body about one-half by three-quarters inches, quite thin and with ragged edges, lying on a level with the third right rib anteriorly and about four inches to the right of the median line.

At an examination made March 24, 1921, the man complained of pain in the right chest, inability to lift as he used to, and expectoration of blood when he lifted hard. He showed no apparent disability. There was a scar one inch long at the right posterior axillary line, healed, non-adherent, without deformity, and with no apparent loss of tissue and no atrophy. All vital organs and extremities apparently normal. A chest examination made September 1, 1925, showed the chest broad and well developed, expansion equal and good, and no râles or adventitious sounds. The diagnosis was chronic fibrous pleurisy.

Case 8.—H. C., on June 7, 1918, at Chateau Thierry, received a gunshot wound of the left chest. Treated at Paris Hospital No. 1 for one month, Base Hospital No. 1 for a month and Base Hospital No. 8 for another month, he returned to the United States January 16, 1919, at which time the wounds were healed. About May 7, 1920, he had a hemorrhage from the lungs of about four ounces in quantity. An examination a week later showed a well formed chest with movements of the left side restricted. There was a scar reaching from the upper part of the left axillary fold to the side of the seventh dorsal vertebra which was adherent to the deeper tissues. Vocal fremitus everywhere was felt; the percussion note resonant except over the scar area. No râles were heard. An *x*-ray plate was made, but in the reading thereof no mention was made of a foreign body. More than three years later an examiner, in making a fluoroscopic examination, discovered a metallic foreign body, 4 mm. x 6 mm., apparently in the upper border of the seventh rib. A plate was immediately made and the foreign body was definitely located in the eighth rib posteriorly. In 1923 this man fell into the hands of two physicians, one of whom suffered from moral imbecility and the other from the paranoid residuals of a dementia præcox, who undertook to operate for the relief of the painful adherent scar and the removal of a callosity on the rib. No relief followed this operation, but one result was an infected perforation of the pleura and the formation of a sinus. A month later it became necessary for a competent surgeon to make a remedial operation, at which time the sinus was excised and a bony spur and two-thirds of the 7th rib removed. The foreign body was not removed. After four weeks in the hospital the man was placed on home treatment and the wound soon healed. When last seen (1927) the man complained of pain on moving the left arm and, on deep breathing, pains running parallel with the ribs around

his left side. The scar (of the gunshot wound and post-operative) on the left side of the thorax, extends from the spine to the posterior margin of the axilla at the level of the angle of the scapula, the spinal end of the scar being depressed and adherent and the balance non-adherent. There is some bronchitis, and a neurasthenia with anxiety neurosis has developed. The man was a chiropractor before entering the service but has been compelled to change his occupation and is now working as a drug clerk.

Case 9.—B. W. At Soissons, France, on July 18, 1918, this man received a gunshot wound of the right arm, with a compound comminuted fracture; a gunshot wound of the left supraclavicular fossa with a foreign body lodged in the upper lobe of the right lung; and an injury to the left brachial plexus. There later developed an abscess of the upper right lobe and the patient was placed under observation for pulmonary tuberculosis. The suspicions were not at that time confirmed. On April 13, 1920, at General Hospital No. 28, Fort Sheridan, Illinois, there was made a resection of the third rib at the sternal junction and the foreign body was removed from the upper lobe of the right lung, after having been residual for twenty-one months.

On March 11, 1921 a diagnosis of active incipient pulmonary tuberculosis was made and the man placed on suitable treatment. When examined August 2, 1927, at U. S. V. H. No. 106, Minneapolis, Minnesota, he complained of pains on both sides and across the front of the chest; coughed slightly during the day; seemed to have a cold all the time; weight 155 pounds; pulse 84; temperature 98.6 at 2:00 P. M. and blood pressure 110-70. The man looked well, was well developed and well nourished; the right shoulder drooped; there was a depression above and below each clavicle, a large healed scar on the right chest, the chest being long, medium broad and flat with poor mobility. The right chest was seemingly fixed. Fremitus was absent and resonance diminished from the third rib to the sixth dorsal spine on the right and from the second rib to the fifth dorsal spine on the left. Increased whispered voice was heard from the second to the fourth dorsal spine. Large coarse râles were present under the scar on the right chest and friction rubs were heard at the base. The conditions found at this examination were diagnosed as: chronic pulmonary tuberculosis, arrested; chronic fibrous pleurisy at right base; paralysis of the left brachial plexus and a traumatic neurosis.

Case 10.—E. J. On July 20, 1918, at Soissons, France, this man received a shrapnel wound of the left lung. He was confined to B. H. 26 for one month, was very weak and coughed up blood for ten days and had some fever and chills. He returned to duty but in July, 1919, while in Germany, was sent back to the hospital for a recurrence of the hemoptysis, pains, chills and fever. The man was unable to do heavy work and after leaving the hospital was put on light duty. In November, 1919, at Camp Taylor, Kentucky, an x-ray showed a small piece of shrapnel in the lower left lung. X-ray examinations made in 1921, '22, '25 and '26 failed to

show any foreign body. In September, 1921, a diagnosis of active pulmonary tuberculosis was made at Thomas Hospital, Minneapolis, and during a fluoroscopic examination at this time there was noted a foreign body, the size of a pea, at the level of the tenth rib and just within the left pleural cavity or outer zone of pulmonary tissue, from which a dense band of adhesions extended to and was adherent to the middle third of the left diaphragm. The diagnosis today is: pulmonary tuberculosis, moderately advanced, arrested; chronic fibrous traumatic pleurisy with adhesions and deformity; foreign body in left lung.

Case 11.—R. O'L., on July 21, 1918, at Soissons, France, received a high explosive wound of the chest, a fragment of metal passing through the lower angle of the right scapula and lodging in the lung. The wound was dressed as a superficial one for three days before a foreign body was discovered in the lung. In September, 1918, the man had pneumonia; in November, 1918, he suffered a slight hemorrhage from the lung and another in May, 1919, which lasted two hours with much loss of blood. He had had about a dozen small hemorrhages up to July, 1920, when he experienced a large one while in St. Mary's Hospital, Minneapolis, after which the hemorrhages grew smaller and less frequent, and he went from December 1, 1920, to March 21, 1921, without any. October 18, 1922, there occurred a profuse hemorrhage, since which time there has been no recurrence although there has always been some slight tinge of blood shown in the first sputum raised each morning. Since 1920 the man has done no heavy work. In May, 1926, there was a recurrent hemoptysis, since which time there has been only an occasional slightly blood-tinged mucus. At no time has there been noted any evidence of pulmonary tuberculosis.

Several x-ray examinations have been made from 1921 to date and all show a metallic foreign body 2 mm. x 2.5 mm. lying in the sagittal plane of the right second rib and about 1.5 inches to the right of the great vessels, which shows evidences of an old pneumonic process around it with thickened branch markings extending outward. The lung apex is clear.

There has been no change of position of the foreign body in the past seven years and it is most probably encysted.

Case 12.—H. T. M., on July 30, 1918, at the Marne, received a high explosive wound of the right chest. Two pieces of metal entered the outer chest wall at the ninth rib, passing backward and lodging near the spine; one of these was removed by operation. Infection followed and pleurisy with empyema developed; he was in bed six weeks. In November, 1918, he suffered an attack of influenza. Apparently there was very little injury to the lung tissue as he presented only slight disability when first examined by me July 20, 1919, his principal complaint being pain in the right chest on deep breathing, shortness of breath and nervousness. The x-ray October 30, 1919, showed an irregular metallic foreign body three-eighths of an inch by one-quarter inch opposite the end of the twelfth rib and about three inches from the spine. On February 25, 1920,

there was noted a slight lagging of lung expansion on the right side, but no râles were heard. October 18, 1922, there was noted a chronic pleurisy and on May 18, 1923, there was noted decreased fremitus and impaired resonance, breath sounds being absent from the seventh rib down on the right side in the infra-axillary region; the other organs were normal. In 1925 there was noted a persistent afternoon temperature, loss of weight and strength, and the man was hospitalized for observation for the lung condition. Diagnosis: pulmonary tuberculosis, chronic, minimal, non-active.

Case 13.—A. L. P., at the Albert front near Rheims, France, on August 12, 1918, received shrapnel wounds of the right shoulder and left hip and shoulder.

An *x-ray* examination made April 12, 1920, disclosed a fragment of shrapnel, apparently encysted, in the upper part of the right lung; also an old united fracture of the sixth rib. Another, made November 24, 1922, showed a slight peri-bronchial infiltration in the right apex and along the trunks in the first and second interspaces on the right. There was a metallic foreign body about the size of a pea, irregularly quadrilateral in shape, lying just below the inner end of the right clavicle at about the junction of the first rib with the manubrium.

An examination made February 29, 1928, showed a chronic **pleurisy of the right side.**

Case 14.—T. J., on August 16, 1928, received a penetrating machine gun wound of the chest, the bullet entering anteriorly. He was treated at B. H. No. 17 (Digon), *x-rayed* and the bullet located but not operated upon. The wound healed in a short time and the man returned to the United States, where he took up blacksmithing.

The patient was first seen by the writer. January 11, 1928, when he complained of tiring easily, soreness in the chest, and loss of six pounds in the past ten years. Inspection showed a fairly long, broad, deep, flat chest. The man was well developed but rather poorly nourished. The clavicles were prominent, clavicular notches retracted, but excursion good, expansion fairly good, and color fair. The subdermal fat was not markedly decreased, there was no muscle spasm, and no increase of tactile fremitus. The percussion note of the right was impaired above the second rib and fifth dorsal spine; no change was elicited on the left. Auscultation: right, breathing harsh throughout, whispered voice increased over upper lobe, no râles; left, breathing harsh throughout, no change in whispered voice, no râles. Present weight 130 pounds, average 135 pounds, highest 155 pounds, lowest 127 pounds. Pulse 84, temperature 98.6 at eleven A. M. Diagnosis: bronchitis, chronic, bilateral; pleurisy, chronic, fibrosis; valvular heart disease; foreign body in mediastinal region directly anterior to body of the sixth dorsal vertebra.

Case 15.—F. A. S., on September 13, 1918, at St. Mehiel, received a penetrating gunshot wound of the right clavicle, the bullet entering two inches above the middle of right clavicle and resting in the chest cavity opposite the sixth interspace in the nipple line. An *x-ray* examination (June 26, 1924) showed a large pointed foreign body in the plane of

the third rib with the point one-half inch from the anterior chest wall; there was slight relative density over the right apex and an increase of parenchymal shadow in the region of the foreign body but no evidence of pleural involvement. An examination March 3, 1925, showed partial paralysis of the right arm, fibrosis of the right lung, chronic bronchitis and hysterical depression with paranoid tendency.

Case 16.—V. J. In the Argonne on October 4, 1918, this man received a high explosive wound of the left shoulder, left knee and ribs. When last examined, May 27, 1926, he complained of weakness of the left arm, shortness of breath, stiffness of the left knee, night sweats, anorexia, and inability to work more than two or three hours daily. Examination showed a well nourished man, six feet tall and weighing 190 pounds. There was a scar eight inches long across the back from the inner margin of the left scapula outwards. Portions of the lower scapula and of one or more ribs were missing. The scar was adherent to the scapula and ribs, producing tension on movements of the left arm. Resonance was slightly diminished below the sixth rib anteriorly and throughout all of the left lower chest below the scar. No râles were heard anywhere. Vocal and tactile fremitus was unchanged. Multiple superficial shrapnel wounds of buttocks, legs, both hands and wrists, back and left forearm were present. Varicose veins of both legs. The diagnosis was chronic bronchitis with fibrosis following gunshot wounds; also disturbed function of the left intercostal nerves. The *x-ray* picture showed the apices clear, but an irregularly shaped foreign body 1.5 cm. by 2 cm. in the lower part of the right lobe. Considerable peri-bronchial thickening was present in left posterior axilla. The seventh left rib, posteriorly, presented a thickened area which casts a bifid shadow.

Case 17.—W. O. O. This man received a gunshot wound of the left upper arm at the Champagne Front on October 14, 1918, the shrapnel penetrating the arm over the deltoid region. The *x-ray* showed no bone involvement. There was (and is) complete paralysis of the hand and forearm with anesthesia of the outer three fingers, marked atrophy of the muscles of the hand and arm with loss of function. The man was taken prisoner and treated in various German hospitals. In December, 1918, he was returned to the United States Army and treated in several hospitals. He returned to the United States March 11, 1919, and was treated at the Naval Hospital, Portsmouth, Virginia, for three months. In August, 1920, he contracted a cold from which pulmonary tuberculosis developed. The patient thought his chest symptoms were due to having been slightly gassed and made no complaint as he thought they would soon pass away. The diagnosis of active pulmonary tuberculosis was made August 9, 1920, and, although repeatedly *x-rayed*, the foreign body in the chest was not discovered until December 29, 1921. When first seen by the writer July 3, 1919, the injury to the arm evidently overshadowed all other trauma and no mention was made of any chest wound, nor do his previous records contain any mention thereof. What the records of the German hospitals contain,

we know not. At present there is a machine gun bullet just under the left diaphragm which passed through the chest. On March 13, 1928, there was an arrested, moderately advanced, pulmonary tuberculosis, a moderately severe chronic fibrous pleurisy of the left chest and paralysis of the left upper extremity.

Case 18.—E. F. H. October 5, 1918, in the Argonne, this man received shrapnel wounds of the chest and foot. After passing through several base hospitals he reached Camp Grant, from which he was discharged January 16, 1919, with all wounds healed. An x-ray taken December 2, 1920, shows diaphragm shadows clear on both sides; no evidence of fluid in either chest; heart and aorta normal in size, shape and position; no evidence of tuberculosis. There is a small metallic foreign body just under the sternal attachment of the second rib on the left side, which is firmly embedded in the lung tissue and moves with respiration. All subsequent examinations show the same condition. Today this man carries a diagnosis of chronic bronchitis and chronic, mild, fibrous pleurisy.

Case 19.—C. D., on October 6, 1918, while in the Argonne Sector, was severely wounded in the nose, right forearm and chest, the latter wound of entrance indicated by a scar 2 x 1 cm. just to the right of the ensiform cartilage. There was no wound of exit. Three months after injury, foreign bodies were removed from the nose and forearm. An x-ray taken June 3, 1922, showed the foreign body located 3 cm. posterior to the anterior chest wall (skin surface) and 5 cm. to the left of the median line. It appears to move with respirations and also slightly with cardiac pulsations. This would seem to indicate the foreign body was adherent to the diaphragm and in close contact with the pericardium. The diagnosis today is chronic fibrous pleurisy due to gunshot wound. The man has been offered operative relief, but refuses the same.

Case 20.—B. C. H. In the Argonne Forest on October 8, 1918, this man received gunshot wounds of the left back, some of which presumably penetrated the lung. Some bullets were removed. Pleurisy developed and the pleura was tapped two or three times. The man was examined frequently but the foreign body in the chest was not discovered until September 29, 1924. An x-ray examination shows what appears to be a shell fragment lying beneath the left scapula between the second and third ribs. No pulmonary or pleuritic changes are apparent and no evidence of pulmonary tuberculosis. On March 31, 1926, there was given a diagnosis of pulmonary tuberculosis, moderately advanced, arrested, lues and arteriosclerosis. The diagnosis of pulmonary tuberculosis is not tenable, as the man has a pronounced leucitic infection with sputum negative for tubercle bacilli.

Case 21.—G. O. H., received a high explosive wound of the chest on October 8, 1918, in the Argonne. No penetration was suspected and the wounds healed readily. At the time of discharge he was pronounced in good physical condition. An examination made November 10, 1919, showed a scar four by six inches between the scapulae, quite tender and adherent in its

upper part to the spinous processes; another the size of a twenty-five cent piece on the posterior axillary fold about the mid-scapular line and a third quite superficial one in the lumbar region. On April 15, 1920, the man requested an examination, stating he was unable to work and in the course of the routine x-ray examination it was noted the left sixth rib had been fractured near the spine and that there seemed to be embedded in its head two pieces of shrapnel, one 1" x 3/8" and one 3/4" x 3/8". Another fragment 3/4" x 3/8" was noted in the anterior mediastinum behind the upper part of the sternum and apparently 1/2" to the right of the median line. This latter fragment moved with cough and deep respiration. On October 11, 1924, a diagnosis of chronic pulmonary tuberculosis, inactive, was made, and February 28, 1927, there was added chronic fibrous pleurisy of the right base. Another examination made April 4, 1927, confirms the previous findings, also showing fusion of the posterior left fifth and sixth ribs.

Case 22.—W. D. C., on October 16, 1918, at the Argonne, received shrapnel wounds of the head and left shoulder. He was discharged March 21, 1919, with a healed gunshot wound of the face and left shoulder and a healed fracture of the clavicle. During the succeeding six years he was given several examinations which were more or less perfunctory because the man denied any disability. However, on February 20, 1925, the man was given a more thorough examination and the x-ray disclosed a foreign body in the apex of the left lung. The man stated he had no complaints, had gained in weight since being discharged, had had no sickness during the past year and his body functions were all good. He has had two colds lasting about one week each; does not cough or expectorate unless he has a cold; no hemoptysis since date of his discharge. There was no change in percussion note on either side; breath sounds were normal throughout the chest; no change in whispered voice and no rales. The chest is broad, deep and well developed; the man is well nourished; clavicles are not prominent, nor are clavicular notches retracted. Excursion is good, but the expansion is poor and restricted over both uppers. No evidence of pulmonary tuberculosis was found and a diagnosis of chronic fibrous pleurisy, traumatic, was made.

Case 23.—G. J. This man received gunshot wounds of the right thigh and leg and left chest and back in the Argonne Forest on October 20, 1918. At time of discharge he had two scars just beneath the left clavicle, one scar in the lumbar region and two in the right lower extremity. At an examination on July 11, 1921, he stated, "My back is awful sore and when I move around it feels like some one was sticking a knife in it." On December 11, 1926, while making a fluoroscopic examination, the examining physician discovered a foreign body in the chest. A plate made two days later failed to show the foreign body but one made April 7, 1927, showed it distinctly at the base of the angle, close to the chest wall and outside of the pleura. This body moves upon heavy pressure from the outside and is apparently

held in place by adhesions to scar tissue. There is a chronic fibrous pleurisy but no other evidence of chest trouble.

Case 24.—C. E. N. On October 29, 1918, at the Argonne, this man received shrapnel wounds of the left hand and wrist and under the left clavicle, all of which healed leaving small painless scars. An examination report made July 24, 1922, states "heart and lungs negative," but no x-ray was taken. Other examinations made prior to August 5, 1924, failed to show any lung involvement. On this latter date an x-ray showed a foreign body about the size of a pea, probably a shell fragment, lying in close relation to the transverse portion of the arch of the aorta. A few months later active pulmonary tuberculosis was diagnosed, with chronic fibrous pleurisy of the left base. Fourteen months later a large cavity had formed and tuberculous laryngitis had developed. The foreign body was not giving rise to any symptoms at that time.

Case 25.—A. K. This man was reported killed in action at the Argonne, November 11, 1918. Later reports, however, disclosed he had received a gunshot wound of the right chest, posterior, and had been taken to a French hospital, where he lay one month with a lobar pneumonia of the right middle lobe. On April 5, 1919, he was returned to the United States, reaching the Naval Hospital at New York April 14, 1919, from which he was discharged to duty on April 23, 1919. Since his discharge the man has made no complaints and not until November 17, 1926, was it discovered he had a foreign body in his chest. At that time there was a scar just to the left of the superior angle of the right scapula, 1.25" x 1", slightly depressed and adherent, not tender, with no apparent loss of tissue and no loss of function. The x-ray showed a foreign body in the right lung, opposite the upper border of the third rib and 1½" from the margin of the sternum. A lateral plate showed the body opposite the fifth dorsal vertebra and about 1.5" from the anterior surface of the vertebra. Today this man reports no disability of any nature and receives no compensation, which is far removed from being killed in action.

From observation of the cases here presented, from previous military and police experience, and from research work in ballistics, the following deductions have been drawn:

Penetration of the chest cavity by a foreign body depends upon several factors such as:

1. Shape: Pointed, sharp-edged, flat or round.
2. Size: Large, medium, small.
3. Consistency: Hard, soft.
4. Force or Energy (Velocity): Strong, weak, spent.
5. Movements of missile:
 - a. Forward, due to impulse of powder explosion or other motivating power.
 - b. Dropping, due to gravity.
 - c. Lateral, due to wind pressure.

d. Revolving on long axis, due to rifling of gun barrel.

e. Revolving on short axis (tumbling), due to air resistance; also to ricochet.

6. Resistance of Tissues Traversed: Soft, medium, hard.
7. Deflecting Obstructions: Clothing, soft tissue, cartilage, bone.
8. Explosive Effects are missing because of the lack of fluid contents and the free outlet of expansive force through bronchi and trachea.

Damage to the lung tissue depends upon the size and shape of the foreign body, its speed, and revolution, if any, upon its short axis.

Shock is not always present in wounds made with modern bullets, which are made of hard non-expanding metals, or are jacketed to prevent expansion. Much and varied experience has proved the small calibre modern bullet of high velocity may penetrate and even perforate vital organs without giving rise to symptoms of shock, and often, where there is stress of excitement or intensive purpose, without even causing an immediate decrease in the physical stamina of the wounded person. A low velocity or spent bullet or an irregular shaped fragment of shrapnel most usually produces shock. Individual physical conditions, resistance and neuropsychiatric reactions play a large part in the origin and continuance of shock. Intoxication, by dulling the sensibilities and creating an artificial belligerency, tends to prevent shock, and because of this fact intoxicating liquors have been designated "Dutch courage."

Dyspnea is present in all cases.

Hemoptysis is noted in 75 per cent of all cases.

Hemothorax is found in 90 per cent of the cases as a direct result of injury to intercostal blood vessels and in 30 per cent of the cases due to injury to pulmonary blood vessels. Hemothorax is frequently caused or aggravated by too early transporting of the patient, a procedure which experience has shown triples the incidence of hemorrhage.

Pneumothorax occurs frequently in cases of injury due to missiles of large caliber or size, but in less than 3 per cent in wounds due to small caliber bullets.

Emphysema increases in frequency with the size of the missile.

Pleurisy due solely to bullet traumatism is rarely seen today, but is frequently noted as a complication where there has been prolonged exposure to severe weather conditions immediately following the injury or where the injury is due to shrapnel.

Infection, when seen, usually depends upon the nature of the missile, the sterility of the first aid dressing and the later introduction of septic foreign matter into the wound.

Abscess is rare, as modern missiles are practically aseptic. Infection may occur in cases of ricochet, where the bullet comes in contact with some septic substance, where pieces of clothing or other extraneous matter are carried into the wound, where there is an intrapulmonary infection or where infection is introduced via a careless or contaminated first aid dressing.

Gangrene is very rare, as the patient usually succumbs before that stage of the infection is reached.

Symptoms may be grouped into the immediate, late and remote, as follows:

Immediate.

- Shock.
- Hemorrhage from wound.
- Concealed hemorrhage.
- Hemoptysis.
- Dyspnea.
- Moist râles.
- Consolidation of lung.

Late. (Within three months.)

- Traumatic pleurisy.
- Traumatic pneumonitis.
- Secondary hemorrhage.
- Infection.
- Pulmonary abscess.
- Dyspnea.
- Cessation of hemoptysis.
- Fever.
- Anxiety neurosis.

Remote. (After three months.)

- Infections.
- Traumatic pleurisy, simple, with effusion or with empyema.
- Cessation of hemoptysis.
- Secondary hemorrhage.
- Tuberculosis.
- Sinus or fistula.
- Encysting of foreign body.
- Intercurrent disease.

Diagnosis.—In immediate cases the diagnosis

depends upon the history of the injury, the symptoms and the *x*-ray findings. Care must be taken to detect malingering and not to be misled by any delusions that patient may have or by the overshadowing symptoms of synchronous complicating injuries. In the later stages of the injury the surgeon seeing the case for the first time may be misled by the lack of acute localized symptoms. Errors in diagnosis are due to failure to correctly interpret symptoms (which failure may be due to ignorance, inexperience, carelessness or laziness), lack of *x*-ray facilities or an imperfect or misleading case history.

In the series of cases here presented it was noted that in only three instances was the presence of the foreign body recognized at the time of the injury, while in twenty-one of them the presence of the foreign body within the chest was not diagnosed until many months after the date of the injury, the time varying from one to seventeen years, the average being 5.2 years, or 3.5 years by excluding the one case which went seventeen years. The history in these cases leads one to believe the presence of the foreign body in the chest in many instances was not even suspected and that its discovery was an unforeseen incident connected with the *x*-ray examination which was part of a routine chest examination.

In four cases, the presence of the foreign body was presumed because there was a wound of entrance, no wound of exit and because of the history and symptoms.

Treatment.—Absolute recumbent rest is imperative in the first-aid treatment of all cases of gunshot wounds of the chest. The incidence of hemothorax is tripled by early transportation of the patient. Hemostatics, stimulants and external applications of heat are the accepted treatment for the immediate symptoms. Later on, resort may be had to tonics, sedatives, analgesics and those internal antiseptics which are transmitted through the blood stream. All fluids coming from the chest cavity should be examined bacteriologically. Operative measures consist of the removal of the foreign body when expedient and possible. Should an abscess of the lung develop, paracentesis may be considered as a last resort; in case of empyema, excision of a section of rib or other suitable operation may become necessary. Should there be a fistula the same should be cleansed daily or oftener with

mercuric cyanide solution (1-4000) followed by the application of mercurochrome solution (2 per cent) or hexylresorcinol solution S.T. 37. Intercurrent diseases and concomitant injuries are treated as circumstances require.

Prognosis in all cases is grave, 10 per cent of all cases dying, while 90 per cent recover from the immediate effects but suffer from conditions developing later. Hemorrhage rarely causes death after the third day in cases where absolute recumbent rest is maintained. Transportation before the fourteenth day too often gives rise to a fatal hemorrhage. Primary infection occurs in 25 per cent of all cases where pleurisy with effusion develops, and of these one-third die. In cases of streptococcal infection, 27 per cent die and 20 per cent of gas bacillus infections die. Should the patient survive his injuries three months, or long enough to become ambulant, the chances are that the foreign body will become encysted, the irritation will be reduced to a minimum and the patient will live for many years and most probably die of some intercurrent disease.

Death in these cases is either immediate, delayed or remote. Immediate death is due to profuse hemorrhage or to the solution of continuity of some vital nerve trunk. Delayed death (within the first three months) may be due to secondary hemorrhage, septic infection, pneumonitis, or to pleurisy with effusion or empyema. Remote death (after three months) may be due to secondary hemorrhage, septic infection, chronic pleurisy, empyema, tuberculosis or other intercurrent disease.

Intercurrent disease, secondary to the injury, is not only possible but highly probable, especially in those cases where there is a tendency to chronicity in the reparative process. Presuming that the wound is primarily aseptic, and the patient is aseptic to himself, there still remains the fact that the traumatism to the lungs and other tissues has opened a virgin field to infection by those germs known to have an affinity for lung tissue. This would be expected of tuberculosis, yet experience has demonstrated that the incidence of tuberculosis in persons suffering from penetrating gunshot wounds of the chest is no greater than amongst other individuals. While it is true the traumatism opens a field of invasion and decreases the resistance of the patient, the unusual surgical and nursing care given the

patient more than counterbalances the deleterious factors and so acts as a prophylactic. After some months, when the condition has become chronic, the surgeon and nurse see less of the patient, the patient perhaps becomes too familiar with his condition, and, as a result of negligence, the infection become implanted on feebly resistant tissues and the mischief is done.

Of the series of twenty-five cases here cited, seven, or 28 per cent, contracted pulmonary tuberculosis, all of whom are today diagnosed as arrested cases. One case carries a diagnosis of arrested pulmonary tuberculosis and a strongly positive Wassermann. In the absence of a positive sputum, the tuberculosis diagnosis is not allowed and this case is not counted in our statistics. Eighteen are marked "no tuberculosis found." Six cases of chronic bronchitis and eleven of chronic pleurisy are noted, but these are to be regarded as residuals of the gunshot wounds rather than as subsequent infections. In four instances the disability at the present time is so negligible as to be rated less than 10 per cent. One case developed a manic depressive psychosis twenty years after receiving the gunshot wound and one has acquired an anxiety neurosis with paranoia.

DISCUSSION

DR. LOUIS B. WILSON (Rochester): I wish to congratulate Dr. Perry on this most interesting and most excellent paper. I should like to say a few words about it from the standpoint of ballistics.

Dr. Perry noted that of his twenty-five wounds of the chest three were produced by rifle or machine gun bullets, two by pistol bullets and the remaining by shell fragments. I think this proportion is probably fairly representative of wounds of the chest with residual foreign bodies which are met with in base hospitals under war conditions. The proportions, of course, do not hold for the number of wounded or the number of killed, since most rifle and machine gun bullets will pass entirely through the human chest. Undeformed military rifle bullets possess more than enough energy, even at 1,000 yards, to carry them through the human chest. It requires a surprisingly small amount of energy indeed to penetrate the human chest under favorable conditions. Even the .22 long rifle bullet with only 108 ft. lbs. of energy at the muzzle of the gun has been known to penetrate both chest walls of man. Most pistol bullets are well under 400 ft. lbs. of energy. They are usually blunt and of larger caliber than military rifle bullets. They may, therefore, fail to penetrate the chest even though the same amount of energy in a pointed rifle bullet would

carry it through unless the latter tipped, thus presenting more striking surface.

Eighty per cent of Dr. Perry's wounds were made by various irregular metallic fragments. These, even when starting with very high velocities, rapidly become slowed in the air. They also require relatively much greater energies than do smooth, pointed bullets to penetrate equal distances into tissues. In general, however, it may be assumed that irregular metal fragments which have lodged in the chest cavity must have had their velocities slowed to less than 500 foot seconds before getting through the chest wall. This explains the absence of widely disseminated trauma in chest wounds with lodged missiles. Velocities of more than 1,000 foot seconds are usually necessary to produce widely disseminated trauma in soft tissues, like the lung. When a gunshot missile has lodged in the chest cavity, we may safely ignore the probability of trauma at any con-

siderable distance from the track of the missile. Such trauma is usually confined to areas not more than 2 cm. from the track of the missile. Splits in the intima of unpenetrated blood vessels are not nearly so frequent as in wounds made by bullets which have gone completely through the chest. It must not be forgotten, however, that large caliber, blunt pointed pistol bullets and irregularly shaped shell fragments are much more apt to carry infection deeper into a wound than are small caliber, smooth rifle bullets. In experimental firing, small, irregular, metallic fragments have been found to carry charcoal from the surface of the animal several times as deep into the tissues as it was ever carried by undeformed military rifle bullets. This is important to remember because in trench warfare it must be assumed that all wounds are infected by bacteria from the clothing or the surface of the body.

RABIES IN NEW YORK STATE

During the year 1928 four deaths from rabies occurred among residents of the State exclusive of New York City: one in Ulster county, one in Nassau county, and two in Westchester county. Two of the victims were adults and two children. Three of the cases did not receive any antirabic vaccine or adequate cauterization of the wounds, while the other, a case with severe face bites, was still receiving vaccine treatment at the time the disease developed.

There were reported to the Department 218 rabid animals in 1928 as compared with 243 in 1927, coming from 88 districts in 1928 as compared with 87 in 1927. In 1926 there were 196 rabid animals reported from 50 districts. While there has been a material reduction in the number of rabid animals reported from Nassau and Westchester counties as compared with two years ago, the number still remains large and the gains have been nearly offset by increases elsewhere. There were 29 rabid animals reported from Orange county as compared with 3 in 1927; 17 from Suffolk county as compared with 7 in 1927, and 30 from Ulster county as compared with 8 in 1927. The disease has now spread up both sides of the Hudson river as far Columbia county on the east bank and Greene county on the west. In March an additional focus developed in Malone, Franklin county, believed to have been introduced from Canada.

Sixty-five districts were under certification of the State Commissioner of Health as to the existence of

rabies on the first of January, 1928. During the year 63 districts were added and the certification was rescinded in 3, leaving 125 at the close of the year. The long incubation period in this disease makes it necessary that a considerable period of time elapse after the last report of a rabid dog is received before certification is withdrawn so as to insure that new cases will not develop thereafter. It has been found very difficult, however, to secure enforcement of the present law requiring muzzling and the collection and disposal of stray dogs for more than a brief period after a rabid animal is discovered. The results are shown in the failure to effect any material progress in the suppression of the disease.

Unfortunately the number of human rabies cases, always agonizing and inevitably resulting in death, do not give the full measure of human suffering for which rabies in dogs is responsible. During the year 221 individuals were either bitten by rabid animals or so exposed to their saliva as to necessitate their being given antirabic vaccine. This consists of a course of injections over a period of fourteen days. The injections are quite painful in contrast with the biologic products used to prevent typhoid fever, whooping cough, diphtheria, etc., and are justified only by the severity of the disease it is desired to prevent.

An amendment to Section 25-a of the Public Health Law will be requested of the Legislature in an effort to secure better and more continuous enforcement of the law in certified districts.—*Health News*, March 11, 1929.

ACTIVE TUBERCULOSIS AND CANCER IN THE SAME INDIVIDUAL*

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A YEAR ago, we presented a preliminary report under the title "Active Tuberculosis and Cancer with Report of Two of Our Cases." Since then, we have been able to find records of six more cases at Glen Lake Sanatorium and have found many reported in the literature.

The common opinion among medical men is that cancer and tuberculosis, both active in the same individual, is a rare state of affairs. Then, to find the two processes active in the same organ or tissue is still more rare. It has been our good fortune to find, at our Sanatorium, records of eight cases in which the two disease processes existed in the same patient and in one of these there was a co-existing lesion in the same organ. Three of these cases came under our personal observation.

Various authors report the existence and non-existence of antagonism between the two lesions. Weighing the available evidence, pro and con, with the experimental work which has been reported, it does not seem that there exists any pronounced antagonism between cancer and active tuberculosis, nor can it be said that the presence of one specifically favors the development or course of the other, with one exception. Lupus does favor the development of epithelioma. One lesion, however, may be more virulent than the other and stop its growth probably by disturbing the source of nutrition.

There are various good and plausible reasons for these two lesions not occurring more often together in the same individual. The first is that of the age incidence. Tuberculosis, as we all know, is essentially a disease of early and middle life, while cancer, as a rule, comes on in the later decades. Study of statistical tables reveals that from 80 to 90 per cent of the cases of tuberculosis die before the age of 50, while from 75 to 90 per cent of the deaths from cancer

occur after 50 years. Muirhead states that in Great Britain the average age for death from cancer is 60 years, thus widening the gap between the age incidence of the two diseases.

The second point of explanation for this infrequent co-existence is that the organs most frequently affected by tuberculosis are not those usually invaded by cancer. Williams¹ has given the distribution in the body of 7,297 cases of primary cancer. In over 80 per cent of the cases, it was found in locations where tuberculosis is relatively infrequent, i.e., breast, uterus, prostate, mouth, lower lip, esophagus and stomach. On the other hand, tuberculosis in adult life is almost always primary in the lung, where few cases of cancer occur.

The third point is the tendency of pathologists in searching for one lesion to overlook the other, by picking, from the gross specimen, tissue for section which is most apt to show typically the lesion grossly more in evidence.

Another point of particular applicability to lesions of the stomach is the relative rarity of tuberculosis of the stomach either primary or secondary. However, Höfer² described a rare form of tuberculosis of the stomach, which is frequently diagnosed as cancer clinically.

Bastedo³ states: "Not only may cancer and tuberculosis attack the same person, but their lesions may lie side by side, they may intermingle or the one may develop in a tissue already the stronghold of the other. Thus regional lymph nodes next to a cancer mass will be considered as metastatic from the cancer and not investigated further. Should these nodes be sectioned and examined carefully many would show tuberculosis."

It is interesting to note that as far back as 1810 there was a diversity of opinion as to the occurrence of active tuberculosis and cancer. It was in that year that Bayle⁴ expressed the

*Read before Hennepin County Medical Society, November 28, 1928.

opinion that cancer and tuberculosis could occur in the same individual and, too, in the same organ. In 1830, Rokitsky,* on the other hand, claimed that a mutual antagonism existed between the two. Fifteen years later, under Lebert* (1844-51), the French school assailed the view of Rokitsky and more recent experience has proven the views of Lebert and Bayle to be correct.

The literature contains reports of a large number of cases of the co-existing lesions in the same individual. In 1,114 postmortems showing cancer 5.5 per cent revealed active tuberculosis. Moak⁷ reports several series of autopsies totalling 4,000, which were performed on cases of active tuberculosis, and from 4 to 11.7 per cent of these showed cancer.

We have been able to find reports of approximately 100 specific cases of associated lesions in the same individual. These include cancerous lesions in the stomach, breast, sigmoid, prostate, cecum, esophagus and lung, with the tuberculous lesions in the lung, regional lymph nodes about the site of the cancer, intestine and anal fistula, in varying combinations.

The records of Glen Lake Sanatorium gave us eight cases as follows:

1. Carcinoma of maxilla and pulmonary tuberculosis.
2. Epithelioma of both cheeks and pulmonary tuberculosis.
3. Carcinoma of bronchus and pulmonary tuberculosis.
4. Adenocarcinoma of breast and pulmonary tuberculosis.
5. Basal cell carcinoma of cheek, tuberculosis of fascia over chest wall.
6. Melanosarcoma of intestine and pulmonary tuberculosis.
7. Adenocarcinoma of sigmoid and pulmonary tuberculosis.
8. Adenocarcinoma of stomach and pulmonary tuberculosis.

This last case, adenocarcinoma of the stomach with pulmonary tuberculosis, also falls into the group of combined lesions in the same organ. Sections of the cancerous mass from this stomach revealed, in addition to the adenocarcinoma, very definite tuberculosis. One section shows a tubercle entirely surrounded by cancer cells (Fig. 1); another shows normal gastric glands next to

a necrotic tubercle on the other side of which is an area of carcinomatous invasion (Fig. 2).

The literature yielded reports of sixty-one cases of the combined lesion in the same organ. These sixty-one are exclusive of the 173 reported cases of co-existent lupus and cancer which came to our attention. Of these sixty-one cases, the lesions occurred in the lung in twenty, and in the stomach in sixteen, while in two the cancerous lesion occurred in the breast with the double lesion in the axillary nodes. The remaining are scattered over the various organs and regions of the body, as one in the esophagus, one in the prostate, two in the cecum, one in the breast, and so on.

As far as active tuberculosis and cancer of the stomach are concerned, one of three conditions exists: (1) cancer may dominate, infiltrating the tuberculous granulation tissue and preventing a successful invasion by the tuberculous lesion; (2) the tuberculous inflammation may overgrow and destroy the cancer; (3) there may exist a close association of the two diseases (symbiosis) without any appreciable destructive influence of the one upon the other.

Finally, all observers are agreed that caseation puts a stop to all carcinomatous invasion due, no doubt, as Borst⁸ and others have pointed out, to unfavorable nutritive conditions.

Various authors, on the other hand, have pointed out the ideal conditions for the development of these two lesions in the same organ. In the stomach, for instance, Faltin⁹ considers hyperacidity and disturbed motility as favorable conditions for invasion of the cancer growth by tubercle bacilli. Other authors believe the tuberculosis is first to obtain a foothold because of the fact that the lymphatic glands along the lesser curvature very frequently show tuberculosis and no cancer.

There is still, then, much speculation as to the hows and whys of these two lesions in the same individual or same organ. That they do frequently occur together can not be denied, and we are convinced that this occurrence is more frequent than is generally believed.

Experimental work in this field to date has not yielded a great deal of literature. What reports we have been able to find, however, are inconclusive. For instance, Centanni and Rezzesi¹⁰ studied the question of antagonism between cancer and tuberculosis in animals. Injection of

cancer cells and living bacilli produced no tumors. Simultaneous injection in a different part of the body depressed the development of the tumor, though in some only temporarily. Previous infection of the animals with tubercle bacilli delayed the development of the subsequently

in the active state in the same individual and less frequently in the same organ.

2. There is probably neither specific favoritism nor specific antagonism between the two except in the case of lupus, which does predispose to epithelioma.

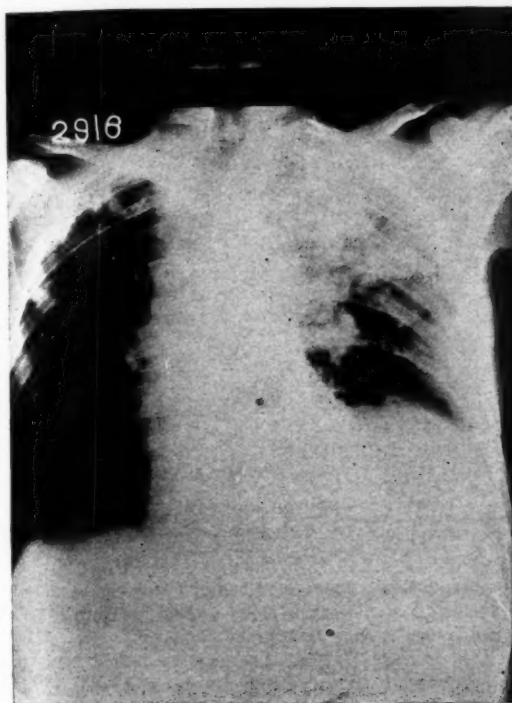


Fig. 1. X-ray plate (Case 1) showing the existing pulmonary lesion.

inoculated tumor. Injection of bacilli into the tumor partially destroyed it. Dead bacilli had no influence. Tuberculin mixed with emulsion of tumor cells retarded growth.

These results would tend to indicate an antagonism.

Maud Slye¹¹ has recently pointed out that white mice bred from cancerous stock inherit a tendency to tissue proliferation following trauma or irritation. In these strains, infections are uncommon and, if they do occur, are resisted well. It is possible that this inherited tendency to tissue proliferation might be a defense against the development of tuberculosis.

This question certainly requires further study and investigation.

In conclusion:

1. Cancer and tuberculosis can and do occur

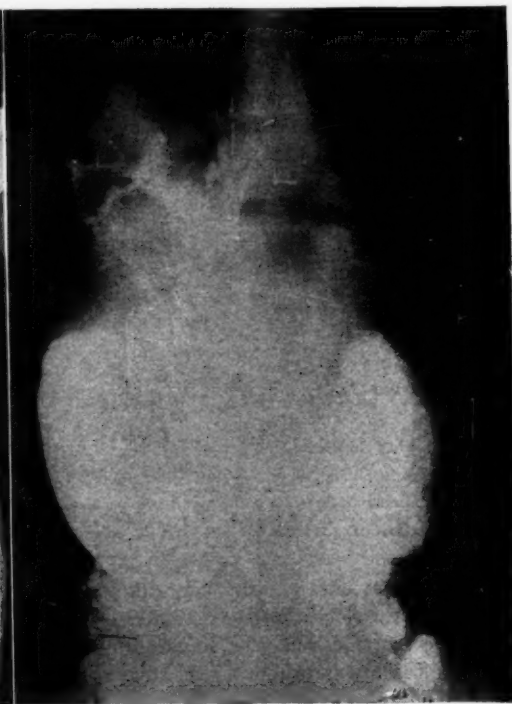


Fig. 2. Plate of stomach (Case 2) following barium meal showing the massive filling defects in the fundus.

3. Cancer certainly has a tendency to develop at the site of a long standing irritation. It seems that scar tissue is a distinct factor in the production or development of cancer and it is probable that a combination of scar tissue with tuberculous disease makes a double preparation for neoplastic growth, the tuberculous process being both an irritated area and one of enfeebled resistance.

4. The two lesions might more often co-exist were it not that (1) the parts frequently invaded by one are not attacked by the other, and (2) the average age incidence for cancer occurs after the large percentage of cases of tuberculosis have died.

DISCUSSION

Cancer certainly has a tendency to develop at the site of any long standing irritation.

There are of course many cases of inactive tuberculosis associated with cancer.

The literature shows many conflicting views as to which disease is primary. Harris believes that tuberculosis, producing a necrosis and connective tissue proliferation, favors implantation of met-

(c) tuberculosis confined to the right upper lobe. A large nodular mass on the right side of the abdomen seems continuous with the right kidney and moves with respiration.

Laboratory reports: Sputum, Gaffky IV to VI. Hemoglobin (Sahli) 40 per cent, 3,940,000 r. b. c., 8,900 white, differential normal. Urine—many leuko-



Fig. 3. The stomach (Case 2) removed post-mortem, showing the large cancerous growth. The probe extends from the cardia to the pylorus.



Fig. 4. Same specimen as Figure 3, opened, showing large mass of cancerous tissue.

astatic tumor cells. In the lungs this certainly is true; however, in our gastro-intestinal cases, I believe that there may be some question as to which disease was primary. In a case reported by U. Simondi¹² of primary cancer and progressive tuberculosis in the same lung, the tuberculosis predominated to such an extent as to obscure everything else.

CASE REPORTS

Case 1.—The patient, a white female aged 66, was admitted to Glen Lake Sanatorium Dec. 4, 1925, complaining of:

1. Inability to work past eight months, weakness and anorrexia.
2. Blood streaked sputum, cough, and severe abdominal pain for five or six months.
3. A feeling of pressure for three to four months.
4. Loose stools, not watery, but with the frequent appearance of blood. Constipation at times. Enemas had to be discontinued because they caused severe pain in the rectum and lower abdomen.
5. Presence of a tumor mass in the left side since discovered in March, 1925.

The patient became a Christian Scientist in May and was relieved of all symptoms for one or two months according to the history.

Physical examination revealed a moderately advanced

cytes and faint trace of albumin being only abnormal findings. Stool—occult blood present January 4, 1925; two other specimens negative.

On January 17, 1926, a surgical consultant made the diagnosis of an inoperable cancer of bowel. Three weeks later, after several days of recurrent chills, the patient died. The patient's temperature had varied greatly from 96 to 104.2 degrees, and pulse from 60 to 126.

Clinical Diagnosis:

Moderately advanced pulmonary tuberculosis.
Inoperable carcinoma of the bowel.

Autopsy Diagnosis:

Adenocarcinoma of distal sigmoid.
Metastatic carcinoma of lymph glands and liver.
Pulmonary tuberculosis.
Miliary tuberculosis of spleen.

Case 2.—A white male, aged 50, was admitted to the sanatorium March 22, 1927, with the following complaints:

1. Chills, night sweats.
2. Dull pain in epigastrium referred to left shoulder.
3. Loss of forty pounds in weight in about one year's time.
4. Diarrhea alternating with constipation.

Physical examination revealed evidence of tuberculosis in the upper and middle lobes of the right lung, the x-ray, however, showing parenchymal involvement to the second rib on the right and the third rib on the left. Later examination showed the presence of a bi-

lateral inguinal hernia, abdominal tenderness on palpation, most marked above umbilicus in midline.

Laboratory reports: Sputum—Gaffky 1 to 11. Hemoglobin (Sahli) 41 per cent; r. b. c. 2,540,000 w. b. c. 10,200, differential normal. Urine, negative, except for very faint trace of albumin. Stool—one showed

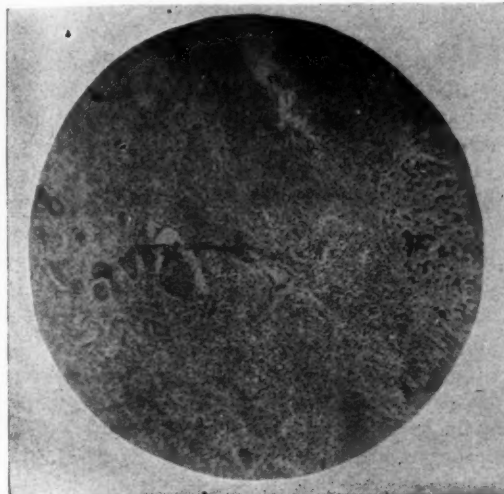


Fig. 5. Microscopic section of tissue from stomach (Case 2) showing: (1) Normal gastric mucosa; (2) Caseous tubercle; (3) Cancer cells.

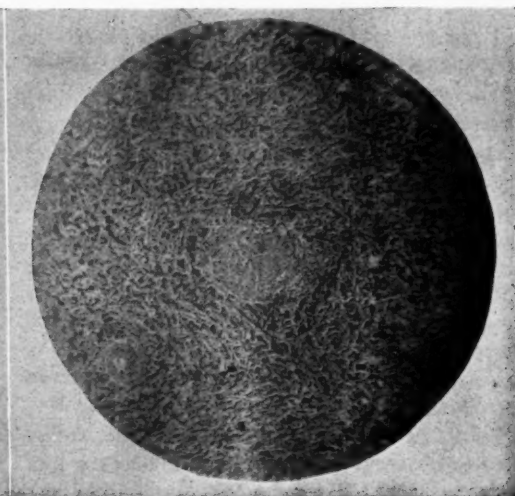


Fig. 6. Microscopic section of tissue from stomach (Case 2) showing a tubercle completely surrounded by cancer cells.

very faint trace of occult blood; two negative. Barium meal—plates read as negative.

A gastro-intestinal consultant saw the patient on May 6, 1927, and asked for more laboratory work. On May 13, 1927, he considered a diagnosis of infection or neoplasm of the stomach, and asked for blood culture, which proved to be negative. Further examination of stools for occult blood proved negative.

The patient's temperature varied during his illness from 97 to 103 and the pulse from 70 to 120.

The patient died June 15, 1927.

Clinical Diagnosis:

1. Pulmonary tuberculosis, moderately advanced.
2. Tuberculosis or cancer of the stomach.

Autopsy Diagnosis:

1. Adenocarcinoma of cardia of stomach.
2. Metastasis in wall of stomach and surface of spleen and lymph glands.
3. Tubercles of lungs, liver and in metastasis.
4. Focal necrosis of kidney.

Note—All of our cases with exception of one were sent to the Sanatorium as not having any non-tuberculous complications.

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EPILEPTIC EQUIVALENTS

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WHENEVER the disease epilepsy is brought to the attention of anybody endowed with an average amount of scientific curiosity the question immediately presents itself, "What is epilepsy?" The disease is so common, its clinical manifestations so spectacular, its origin so obscure, and its variations so interesting that the medical literature of the entire world is teeming with theories as to its cause. It would be a physical impossibility to review critically all of these theories in one evening, and inasmuch as none of them can be incontrovertibly proven we will, for the present, pass them by.

In the early days of modern medicine almost every disease accompanied by convulsions was called epilepsy. Brain tumors, syphilis of the central nervous system, uremia, various intoxications, and convulsions due to congenital deformities of the brain, all were included under the general term of epilepsy. As our medical knowledge and diagnostic acumen advanced, these entities were gradually sifted out from the general group until today the diagnosis of essential epilepsy is made only after all other possible causes for the convulsions have been excluded. But, have we yet reached rock-bottom? Is the disease which we now know as essential epilepsy as yet a homogeneous entity? Does it not still include conditions that in years to come will be separated out until the entire group has been divided into entities which will be as well understood as uremia and cerebral syphilis are today? I think this is extremely probable.

A convulsion is the response of an organism to the stimulation of a certain pattern of motility which exists in the brain. This pattern* of motility depends for its design upon the areas of cerebral substance which are functionally active; that is, the type of convulsion produced can be made up only of movements which can be elicited from those parts of the central nervous system which are intact.

Many investigators speak of a convulsive center. This has been defined by Davis and Pol-

lock¹ as "that area of the central nervous system from which a convulsion can be released following a suitable stimulus." In all probability this area is not a true anatomical center but merely a nodal point or physiologic center. According to Davis and Pollock, who have carried out some ingenious experiments, this center is in the medulla oblongata. Furthermore, there is no specific stimulus for this center. From it, convulsions may be liberated by various toxic, mechanical, thermal, and electrical stimuli.

Therefore, what we now regard as essential epilepsy is but a sequence of events produced by the stimulation of a certain physiologic center in the brain by one of a variety of agents. In many cases of human epilepsy this agent apparently is some product of a deranged metabolism. Evidence in support of this belief is adduced by the improvements seen in the condition during fasting,² the low basal metabolic rates in a majority of the cases,³ and the reported alterations in blood chemistry. The convulsive discharge may be evoked also by organic changes in the brain substance: inflammation, tumors, and variations in the pressure of the cerebrospinal fluid. Temple Fay reports pathologic changes in the Pacchionian bodies with disturbed cerebrospinal fluid circulation in many epileptics. In these cases decrease in the number and severity of the fits follows restriction of fluids. Alzheimer has described fibrotic changes in the hippocampal gyrus in a number of epileptics. The only difference between symptomatic and essential epilepsy, then, is that in the former we know the nature of the stimulus to the convulsive center, while in the latter it is not apparent.

Assuming all the foregoing statements to be true, the question might well be asked, "Why do some people suffer from epilepsy while others do not?" The answer to this lies in the fact that the threshold for various parts of the brain varies in different individuals. There is, undoubtedly, a chemical as well as a physical difference between the different areas in an individual brain

as well as in brains from different individuals. We know that in children there is an augmented convulsibility as compared with adults. This is seen in the convulsive response of children to the onset of acute infections, to gastro-intestinal intoxications, overeating, and so forth. As the individual grows older the convulsive threshold rises, and when adult life is reached it is very high. I recently saw a patient seventy years of age who had had epilepsy from the time he was twenty-eight until he was sixty-five. Then, for some reason or another, his fits stopped. In other words, the threshold for his convulsive center was raised to a point above the maximum stimulus that could affect it. In epileptics either the convulsive center is hypersusceptible or the stimuli acting upon it are, as a result of deranged metabolism or organic cerebral changes, of unusual intensity.

The next question to be answered is that of the epileptic personality and of epileptic mental deterioration. I agree with Notkin,⁴ who, after examining a large number of epileptics in institutions, believes that the so-called epileptic personality is a result rather than a cause of the disease. This personality is seen principally in individuals in whom the disease appeared at an early age, and always followed, rather than preceded, the appearance of the convulsions. Therefore, I believe that this personality is the result of the convulsions and all their social implications. Because of their affliction the individuals become introspective, egocentric, hypersensitive, and irritable. Their attempted indifference to the scrutiny of the social milieu leads to emotional poverty. In the case of epileptic dementia the deterioration is, in all probability, due to the same organic cerebral change that produced the convulsions (sclerosis, physio-chemical changes, and so forth).

When we come to the question of epileptic equivalents we encounter a somewhat difficult problem. At first glance it appears to be irreconcilable with the theory just presented. Before taking up this question, however, let us define what is meant by an epileptic equivalent. Epileptic equivalent is a state in which the convulsive discharge, instead of taking place at the physiologic level (clonic and tonic muscular contractions), occurs at the psychologic level (episodes of abnormal mental activity associated

with corresponding behavioristic anomalies always episodic in nature).

I stated before that a convulsion is the response of an organism to the stimulation of a certain pattern of motility which exists in the brain. In the case of epileptic equivalents this pattern resides at the psychologic rather than at the physiologic level. That this pattern may be activated and the corresponding mental outburst produced by a variety of stimuli is seen in the episodic mental phenomena observed in cardiovascular disease, cerebral arteriosclerosis, eclampsia, brain tumors, and cerebral syphilis.

Our knowledge of the physiology of thought is not yet clear enough to afford an accurate explanation of just what the determinants of this equivalent pattern are. When we know more about the physio-chemistry of brain tissue we may be able to penetrate the veil of mystery shrouding this problem.

Without attempting further to explain the genesis of epileptic equivalents, I wish to report a few cases seen by Doctor Hammes and me during the past few years. Most of these cases were relieved by the usual treatment for epilepsy.

Case 1 was that of a married woman thirty-seven years old with a negative family history. At the age of fourteen she had had several convulsions. At 16, coincident with the onset of menstruation, she had two fainting spells. At 28, just before a menstrual period, she had another. Otherwise she was well until January, 1926, when she had her third child. About three months after the delivery, which was perfectly normal, she began to have compulsive ideas occurring in spells. She had a feeling as if she wanted to seize somebody and harm him. At times this feeling was directed toward her baby, and at others toward her mother. After the impulse the patient would become very much frightened for fear that some day she might not be able to control herself. The patient's mother stated that during the spell her face would become flushed, her eyes staring, and she would complain of feeling sick all over. After the spell she would have a terrific headache for a short time and between spells felt perfectly well, forgetting all about her trouble. A few months after the onset of this trouble the patient began to have typical attacks of grand mal. The physical, neurologic, and serologic examinations were negative throughout. A diagnosis of epileptic equivalent was made, the patient placed on luminal, calcium lactate, and a diet, whereupon the spells ceased. When we last saw her she had been free from spells for over a year.

The diagnosis in this case was based upon the patient's past history, the episodic nature of the attacks, her appearance during them, her well-

being between them, the subsequent appearance of the typical grand mal attacks, and the response to therapy. The only other condition to be considered in the differential diagnosis is major hysteria. This can be ruled out by the absence of any other hysterical stigmata, the well-being between the spells, and the complete absence of any emotional or mental conflicts in the patient.

Case 2 was that of a girl fifteen years old whose father was an alcoholic. The patient's menses were established at the age of fifteen and ceased after her second period. At that time her mother noticed that she occasionally would seem "peculiar" for about an hour. The patient acted as if she were "out of her mind," would strike her mother, talk irrationally, become noisy, and eat a meal in a dream-like state without knowing anything about it. These episodes occurred almost daily and following them the girl could remember nothing about what she did during them. A few months later she had a typical attack of grand mal and continued to have them until her death. The physical, neurological, and serologic examinations were negative. A diagnosis of epilepsy with epileptic equivalents was made but the patient failed to respond to treatment, underwent gradual mental deterioration, and died in status epilepticus at the age of sixteen.

In this case the convulsions occurred in both the physical and the mental spheres. The death in status epilepticus was in all probability due to myocardial failure.

Case 3 (already reported elsewhere by Dr. Hammes⁶) was a ten-year old boy who was seen by us in consultation with Dr. A. A. Meyer, Melrose, Minnesota, on April 12, 1924. One maternal aunt had died of epilepsy and the mother was a somnambulist. During the three years before consulting us the boy had had two attacks of typical grand mal. Three weeks before we saw him an employe on his father's farm had frightened him and the patient fainted, remaining unconscious for about three minutes. Following this he felt very tired for a while. A few hours later when the boy saw the man again he had another fainting spell, following which he became acutely disturbed, running about, biting, scratching, and tearing various objects to pieces. Since that time at varying intervals and without any provocation whatever the boy would go through the same performance, becoming violent, trying to jump out of windows, striking people, and so forth. If left alone he would quiet down in a few minutes but remember nothing of what had happened. Physical and neurologic examinations were negative throughout. The patient was put in a sanitarium for observation and treatment, and during the five months that he was there had several attacks of grand mal as well as numerous equivalent attacks. However, these subsided under treatment for epilepsy and the boy returned home, where he has remained well ever since.

In the above case a psychic stimulus liberated the motility pattern at the psychologic level.

That the pattern also at the physiologic level can be activated by the same sort of stimulus is seen in the fact that many epileptics have spells following some fright, an argument, or some other severe emotional strain.

Case 4 was that of a married woman thirty-four years old who was seen by us on June 1, 1928, in consultation with Dr. F. C. Schuldt of St. Paul. A maternal aunt had migraine and one sister was subject to peculiar choking spells which the patient was unable to describe accurately. Ever since she herself could remember, the patient had been subject to migraine. Six years before consulting us she had had eclampsia and albuminuric retinitis. Since that time she had been having spells characterized by an extraordinary tingling sensation over her entire body, usually lasting for several minutes. Along with this sensation there always was much gas in the lower abdomen and severe cardiac palpitation. Friends have told the patient that during the spells she always trembled and became very pale. The spells came on at intervals from once a week to several times a day, and they occasionally awakened the patient at night. They frequently followed the ingestion of candy or rich food. Five weeks before we saw her the patient had had a typical attack of grand mal lasting four minutes. The neurological, physical, and serologic examinations as well as the basal metabolic rate revealed normal findings. A diagnosis of epileptic equivalent was made and the patient responded to therapy.

The diagnostic features of this case were the family history, the low threshold of convulsibility as indicated by the fits accompanying the pregnancy, the patient's appearance during the attack, the fact that the spells awakened her at night, the attack of grand mal, and the response to therapy. Hysteria is ruled out by the nocturnal occurrence of some of the spells.

Case 5 was that of a single woman, thirty years old. Her family and past histories were irrelevant. For three years before consulting us she had been subject to peculiar spells occurring only at night. They never were associated with a dream and always would awaken the patient from a sound sleep. She would suddenly jump out of bed and run into the next room in a state of extreme terror. During the spell her face was very pale and the pupils dilated. After the spell her left arm would always feel numb as far up as the shoulder and remain so for about an hour. She never slept on her arm. There always was an amnesia for the attack. The physical and neurological examinations were negative. A diagnosis of nocturnal epileptic equivalent was made, the patient placed on 1.5 grains of luminal at bedtime, and the attacks ceased.

Here the diagnosis was based principally on the nocturnal occurrence of the spells. As stated before, hysteria rarely, if ever, will awaken a patient from a sound sleep.

Case 6. A married woman aged 28 was seen by us on February 1, 1927, in consultation with Dr. Arnold Schwytzer of St. Paul. Her family and past histories were negative. Three months before consulting us she began to have spells characterized by marked weakness, emotional depression, mild confusion, and unmotivated fear. About fifteen minutes before each spell she had a herald consisting of a peculiar sensation of numbness involving the entire body. During and sometimes after each attack, which lasted for several minutes, the patient had a severe headache. Her husband stated that during the attacks she frequently said and did peculiar things although she never remembered anything about them. Upon one occasion she arose in the morning apparently well. A few minutes later the family observed her coming down stairs in her night-dress saying that she was going out. At another time her people found her rocking back and forth in a chair, fondling an old coat, and saying that it was her baby. She finally took the coat to bed with her but remembers nothing of the episode. At another time she attacked her father and had to be subdued by force. Always during the spells she had a frightened, staring expression, and afterward complained of a headache. Physical, neurologic, and serologic examinations were negative. A diagnosis of epileptic equivalent was made, and after a rather tedious convalescence the patient was free from attacks.

The attacks in the above case were either hysterical or they were epileptic equivalents. The absence of any emotional conflicts, the patient's freedom from all worry, her happy family life, and the absence of all other hysterical stigmata, led us to the latter diagnosis.

Case 7. A married woman aged 32 was first seen by us in March, 1927. One brother was subject to fainting spells, two maternal aunts and two maternal uncles had "nervous breakdowns," and the patient and one sister had had migraine for many years. One year before consulting us, while her husband was chasing her in a game of "tag," she suddenly became hysterical, screamed, cried, and ran aimlessly around for about ten minutes. She then became entirely normal but had a total amnesia for the episode. She felt sleepy for a short time but continued with her house work. Three or four times after that the patient "went to pieces" over inconsequential things. She always repeated the same performance as during the first attack. Physical, neurologic, and serologic examinations were negative and the diagnosis rested between major hysteria and an epileptic equivalent. Upon questioning the patient closely it was found that she had been subject to fainting spells ever since childhood. While these were not typically of the grand mal type, they had several aspects which were very suggestive of so-called essential epilepsy. The spells disappeared under luminal therapy and diet.

Here we have a case in which the psychic equivalent always was conditioned by an emotional stimulus. It is conceivable that if thought

is a physio-chemical process, the changes in the brain incident to certain degrees of excitement might activate a pre-existing motility pattern.

Case 8 recently came under my observation in the Neurologic Clinic of the Wilder Dispensary. It is that of a fifteen-year-old girl whose parents were addicted to drinking, immorality, and dishonesty. The father had served a penitentiary sentence for burglary and the mother had, in the meantime, an illegitimate child with gonorrheal ophthalmia.

At the age of nine, because of the unsatisfactory home environment the patient was put in an orphanage. Nothing unusual occurred until about two years ago when she was found at the dining table crying. On being questioned as to the cause she stated that she had a severe headache and did not care to eat. The Sister in charge suggested that she go to bed. She left the dining room and instead of going to the dormitory walked down stairs. The Sister followed her and found that the child was in a dazed condition and was unable to find her way to her bed. She spoke incoherently and apparently did not understand anything that was said to her. She was put to bed and was later found sitting on the floor near her bed crying. When she finally went to sleep she slept profoundly and in the morning felt well and acted normally. A similar "scene" has been enacted at intervals of about five weeks. Since the first spell the Sisters have noticed that the patient is unusually "dreamy."

In questioning the child she has stated that she has had three bad headaches but has suffered no other pain. She said, "I don't know what I am doing when I have one. I can't understand what Sister is saying, though I know that she is trying to tell me something."

The Sisters who saw the patient while she was in this state say that the color left her face, and that she became very haggard and drawn looking. There was no noticeable twitching and no frothing.

She was referred to Dr. Max Alberts of this city, who placed her on luminal and referred her to the Neurologic Clinic, where I saw her in February, 1929. The neurologic and serologic examinations were negative throughout. She stated that as long as she took her medicine she would be free from spells, but if she neglected to take the luminal the spells would recur.

The above case is undoubtedly a pure epileptic equivalent. All organic causes for the condition have been ruled out and the extremely bad family history together with the episodic nature of the attacks and the response to therapy substantiate the diagnosis.

CONCLUSIONS

1. Our present concept of essential epilepsy probably still includes entities which in the future will be separated out from the group and considered as different diseases.
2. It is probable that the entire group some

day will be split up into well-defined clinical entities.

3. What we now regard as essential epilepsy is but a sequence of events produced by the stimulation by one of a variety of agents of a certain physiologic convulsive center in the brain.

4. This agent may be anything from products of a deranged metabolism to fibrotic changes in certain brain areas.

5. The threshold of convulsibility varies in different individuals. It increases as the individual grows older.

6. The so-called epileptic personality is the result rather than the cause of the convulsions.

7. An epileptic equivalent is a state in which the convulsive discharge occurs at the psychologic rather than at the physiologic level.

8. The pattern of motility for epileptic equivalents lies in the mental sphere, while that for ordinary epilepsy lies in the motor sphere.

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*"The pattern theory is not a spiritistic one that assumes an appearance of energy from an extramaterial sphere, but merely claims that exhibitions of energy in the biological field may be given their direction by agencies not subject to physico-chemical laws." John T. MacCurdy in "Common Principles in Psychology and Physiology," MacMillan Co., Cambridge, England, Page 11.

MOUTH WASHES AND DENTIFRICES

Nowhere is scientific thought and even honesty more disregarded than in the pseudobiochemical propaganda inseparably connected with the exploitation of dentifrices and mouth washes. Consider for instance what advertising writers are pleased to term "acid mouth." It is well known but not often admitted in the propaganda of certain dentifrice manufacturers that the P_H level of the saliva is maintained regardless of the material introduced into it. Dentifrices of both acid and alkaline nature are sold with the claims that they will correct all sorts of supposed conditions in the mouth. Many of the alkaline dentifrices, presumably designed to correct mouth acidity (which in a sense is the normal condition), are especially blatant in their announcements. If an abnormal acid or alkaline condition is present in the mouth, there is probably an underlying constitutional cause which should have the expert attention of physician and dentist. Sooner or later, manufacturers of dentifrices will have to heed the results of scientific investigation. The chief purpose of a dentifrice is to clean the teeth, or, more practically, to establish a healthy habit. The balance of evidence is against the view that dentifrices can be used for so-called mouth correction. (*Jour. A. M. A.*, March 16, 1929, p. 899.)

MEDICAL PRESCRIPTIONS OF ALCOHOL

During 1928, 68,951 physicians used prescription books as contrasted with 48,097 in 1927. The number of licensed physicians in those states which permit the use of liquor for medicinal purposes is 116,756, so that a little more than one-half the total number of physicians permitted to prescribe alcoholic liquors avail themselves of the opportunity. Slightly more than 10 per cent of all the physicians who might prescribe alcoholic liquors used the total number of prescriptions afforded them by the government. The total number of prescriptions issued during the year increased from more than eight million in 1922 to approximately thirteen and a half million in 1925 and then decreased to less than twelve million in 1927. At the close of the year the number of outstanding permits of this kind had increased to 101,052. (*Jour. A. M. A.*, March 30, 1929, p. 1130.)

VACCINES FOR PREVENTION OF MENINGITIS

The use of vaccines for the prevention of epidemic meningitis has not been extensive enough to establish any definite general medical opinion in regard to its value. (*Jour. A. M. A.*, March 23, 1929, p. 1008.)

COMPLETE TEMPORARY PHRENIC NERVE PARALYSIS*

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PHRENIC nerve paralysis occurring in the course of disease in the chest has only begun to be recognized since the advent of common fluoroscopy and plating of chest diseases. The physical signs are such that in the absence of chest disease there is no difficulty in recognizing this condition. However, in the presence of pulmonary or mediastinal lesions the signs resulting from paralysis, complete or partial, of one phrenic can be easily ascribed to the existing lesion rather than to the true cause. An absolute diagnosis can only be made by fluoroscopic examination of the chest.

There is no doubt but this condition occurs much more frequently than is commonly supposed or recognized. In the texts and systems of medicine, if it is mentioned at all, it is given merely a line, saying that it has been known to occur. The only paper on the subject that we have been able to find is that of Sir Charlton Briscoe in *The Lancet*. In a report on thirty cases of this syndrome he states that the last fifteen cases observed by him have been seen in the last year. It would therefore seem to us that this condition is at least one of the common rarities accompanying intrathoracic disease, and that the number of cases seen will bear a direct ratio to the number of patients in which it is looked for.

The popularization of phrenicotomy in the treatment of lower lobe tuberculosis is at the present time giving publicity to the signs that accompany the blocking of the phrenic nerve. The question will be raised whether it is theoretically possible for inflammatory or malignant structures in the mediastinum to exert sufficient pressure upon the phrenic nerve to cause a blocking of the impulses descending along it to the diaphragm. In experimental work on this, Briscoe has found that the less pressure applied the longer it will take to act, but that it will eventually act, and he concludes: "The results in general show that the pressure necessary to cause paralysis varies inversely with the duration of application. The

amount of pressure exerted by pathological conditions on the phrenic nerve during life is not known. Since, however, the smaller pressures used in these experiments are comparable with the diastolic pressure in an artery, and were found effectual, the pressure only acting for the short time allowed for the experiment, we can assume that growths, glands, or fibrous tissue, acting over much longer periods of time, can easily exert sufficient force to block nerve impulses."

PHYSICAL AND ROENTGENOLOGICAL SIGNS

On inspection of the chest it will be noticed that the side affected has a diminished excursion on inspiration. Further, on close examination it may be frequently demonstrated that the costal angle moves upward and inward on deep or on normal inspiration, in contra-distinction to the opposite one which moves downward and outward. Furthermore, careful inspection of the interspaces in thin chested individuals will sometimes reveal that these are retracted during inspiration. At times the entire chest will appear to be asymmetrical, namely, the affected side will seem to be smaller. However, all these signs may, with the exception of the retraction of the interspaces, occur in other and more common pathological conditions. It does not seem to us that the single sign of interspace retraction is present in a sufficiently marked degree to form, for the most of us, at least, a symptom upon which we can with assurance make the diagnosis. Palpation will confirm what we have observed by inspection.

Percussion of the affected side will reveal a moderate degree of dullness, about the amount that would be in keeping with a markedly thickened pleura, or a small amount of pleural exudate. Again, pleural exudate is without doubt much more common than phrenic nerve paralysis. Further, it will show posteriorly that no movement of the diaphragm can be demonstrated. This again is a frequently observed sign due most

*Read by invitation before the medical staff of the Lyman-hurst Hospital School, Minneapolis, Minn., September, 1928.

commonly to either lower lobe disease at the diaphragmatic surface or to hydrothorax.

Auscultation reveals diminished or absent breath sounds, with no pectoriloquy or bronchophony. This again is most commonly found in the case of a thickened pleura or a small amount of hydrothorax.

Flat or stereoscopic plates of the chest will show the underlying trouble, and in addition will reveal that the diaphragm is unusually high on the affected side. This should give us a very definite hint as to the possibility of phrenic paralysis. If the case is then fluoroscoped, and the observer has sufficient confidence in his observations, his report will include the statement that the diaphragm of the affected side is situated in the fourth or fifth interspace and reveals the pathognomonic sign of phrenic involvement, namely, that on ordinary respiration, when the opposite dome descends, this side of the diaphragm ascends higher in the chest. This can only occur in the case of phrenic paralysis. The mechanics are relatively simple: when the normal diaphragm descends, it exerts a negative pressure throughout the thorax, and as the affected half of the diaphragm acts as an inert membrane, it will mechanically attempt to compensate the movement of its other half by rising further into the chest. This is ideally simple, but like most other things in medicine there is a catch in it. In most cases of this kind the paralysis is not absolute and if the observer asks the patient to take a real deep inspiration he will be surprised to observe that instead of the unusual movement of the diaphragm it will either remain stationary or else it will move slightly downward. This is best explained in one of two ways. Either an especially deep respiration is accompanied by a sufficient contraction of that portion of the diaphragm not innervated by the phrenic (the part near its costal attachment) or, what according to Briscoe is more likely, the increased stimulus on the phrenic nerve as the result of the deep inspiration is sufficient to overcome the physiological block, with the result that the usual impetus to contraction arrives at the diaphragmatic muscle.

OCCURRENCE

This condition can occur with anything causing an enlargement in the upper part of the mediastinum. The most frequent cases are probably

malignancy, syphilis, benign glandular enlargements around the base of the lungs, aneurysm, and tuberculosis. The part that glandular enlargements play in the etiology can not but make the observer speculate as to the probable frequency of tuberculosis playing a rôle. The only case of tuberculosis causing this, however, is included in Briscoe's series. In Sir Charlton Briscoe's series, the causes were as follows: six had syphilis and no other demonstrable lesion; one case was due to aneurysm and was confirmed at postmortem; three cases were due to primary glandular enlargement, two of which came to postmortem; in twelve there was a primary growth in the neighborhood of the base of the lung, confirmed by postmortem in ten; seven were due to secondary deposits of malignancy from a primary growth elsewhere and all were confirmed by postmortem examination; one case was due to tuberculosis of the mediastinal glands. The single case that we have seen was without doubt due to glandular enlargement as the result of a streptococcic pneumonia.

CASE REPORT

L. O., white, male, aged 30, was admitted to the Lakeview Memorial Hospital on March 1, complaining of pain in the right lower quadrant, nausea, malaise, and pyrexia. Physical examination at that time revealed a small area about 3 cm. in diameter in the right chest corresponding to the upper part of the right lower lobe posteriorly, in which could be heard râles and pectoriloquy. Examination of his abdomen revealed increased tone in the right rectus muscle and tenderness over the cecum. A diagnosis was made of right bronchopneumonia, with the possibility of recurrent subacute appendicitis (patient gave a history very suggestive of former attacks of appendicitis). On account of the pulmonary findings it was decided to defer operation, and the patient was given only fluids by mouth, and an ice cap applied over the region of the cecum. His course in the next ten days justified our actions. His pneumonia spread so as to involve the entire right middle and lower lobes, there was the production of a bloody purulent sputum, in which only streptococci could be seen on smear, and the abdominal symptoms became quiescent by the end of the first week of hospitalization. After the first two weeks, his temperature began to fall and his pneumonia ceased to spread. He was confined to the hospital for an entire month, largely on account of the fact that his chest failed to become clear, and he continued to run some temperature. Eventually his temperature became normal and he was discharged, dullness and râles still remaining over the entire right lower chest. At his first visit to the office, about a week subsequent to his

discharge, it was found that the chest findings were unchanged. It was noticed that at this time there was a complete absence of movement of his right side, and that his right costal arch, if it moved at all, moved inward and upward on respiration. He was fluoroscoped and it was found that there had been little resolution in his lower lobe, and that in addition the diaphragm was abnormally high, and that it moved upward instead of downward on deep inspiration as well as on ordinary breathing. He was told to eat well, sleep long hours, and stay in the open as much as possible, and to do no work. He returned in another ten days, feeling much better, and examination showed that there was a downward movement of the diaphragm on deep inspiration, though it still moved upward on normal breathing, and that the lower lobe had become much more penetrable to the rays. He returned a month later feeling excellent and at that time his chest was practically clear and the movements of his diaphragm were normal.

DISCUSSION

An interesting point in this case is the question of what part the paralysis of the diaphragm had on the slow resolution of the pneumonia. It seems very likely to us that the paralysis of the diaphragm and the subsequent lack of normal aeration in the lower part of the lobe accounts for the slow resolution.

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THE QUESTIONNAIRE NUISANCE

One of the many by-products of the modern art of advertising is the advertising agency, whose business it is to prepare advertising campaigns for those who wish to cry their wares in the market places. Out of the business of preparing advertising campaigns has grown one of the most intolerable nuisances that ever plagued the medical profession—the questionnaire. The fault rests primarily on those members of the profession who, with easygoing tolerance, give, for the asking, expert opinions that are based on much work and special study. Some of these questionnaires come frankly from advertising agencies; others, although also emanating from advertising agencies, are camouflaged with names such as “research” or “bureau.” The following are some of the questionnaires with which the medical profession has been plagued during recent years: Lord and Thomas, advertising agents of Los Angeles, sent letters to dermatologists in the interest of the California Fruit Growers Association on the effects of lemon juice when used as a hair rinse. Lord and Thomas and Logan, New York, circularized physicians in the

interest of the manufacturers of “Lucky Strike Cigarettes.” Williams and Cunningham, an advertising agency, went to the profession seeking advertising data on asthma and hay fever. Physicians received a questionnaire from “The Editors” of the *Medical Review of Reviews*, addressed to dermatologists, regarding a survey of methods of washing the hands to insure freedom from skin diseases, preservation of line and contour, etc. The National Research Bureau of Cincinnati (a fancy name used by Procter and Collier Co., an advertising agency) also sent out a questionnaire to dermatologists. A questionnaire was sent out by the “Medical Research Bureau” of New York, dealing with the use and prescribing of sedatives, the data to be used by John B. Daniels, Inc., Atlanta, Ga., makers of Pasadena. A questionnaire was sent out by the “Medical Research Bureau” of Chicago in regard to a profit-sharing method of supplying drugs in quantities direct from the wholesaler. Physicians should consign to the wastebasket every questionnaire that asks for free advice and comes from commercial or unknown sources. (*Jour. A. M. A.*, March 23, 1929, p. 1004.)

BLOOD PRESSURE VARIATIONS IN SEVENTEEN NORMAL WOMEN*

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SINCE many reports of blood pressure determinations have been based upon one observation on each individual, made under rather unfavorable circumstances (without attention to physical condition, previous activity, psychical condition, etc.), we thought it worth while to make frequent determinations upon the individuals of a group of women over a period of several weeks. The observations were made during October, November and December, 1928. The women were students in the University of Minnesota, between eighteen and thirty-seven years of age, and in good health. All of the readings were made by two of the authors. Observations were made at one o'clock, and again at five o'clock, on the same afternoon, whenever possible. The students were brought into a quiet room, two at a time, and the pressure determined in the reclining position after about five minutes rest. They then stood, and the standing pressure was determined after about three minutes.

The means and standard deviations were found by the usual statistical methods. Since there were seventeen individuals on whom observations were made at various times, and since blood pressure may vary from individual to individual, or from day to day in the same individual, it is probable on *a priori* grounds that two blood pressure readings made on the same individual at two different times, or in two different positions, on the same day, will be correlated. In determining the probable error of the difference between the mean blood pressures† in the reclining, R, and standing, S, positions, we therefore use the formulæ

$$\sigma_{(R-S)}^2 = \sigma_R^2 + \sigma_S^2 - 2r_{RS} \sigma_R \sigma_S \text{ and } E_{(R-S)} = .6745 \sigma_{(R-S)} / \sqrt{N}$$

From the actual data we found that the correlation between the systolic pressures in the reclining and standing positions, r_{R,S_1} , (to be dis-

cussed later) was .821, and r_{R,S_5} was .824. Likewise, the correlation between the reclining systolic pressures at one and at five o'clock on the same day, r_{R_1,R_5} , was .620.

On the seventeen individuals, 176 observations were made in each position at one o'clock, and 113 at five o'clock. The results are presented in tabular form, the probable error of the difference in both systolic and diastolic pressures being determined by the above formulæ.

	One o'clock	Five o'clock
Mean Systolic Pressure		
Reclining	114.43 ± .54	115.13 ± .62
Standing	112.98 ± .49	112.26 ± .58
Difference	+1.45 ± .31	+2.87 ± .36
Mean Diastolic Pressure		
Reclining	70.14 ± .31	72.52 ± .36
Standing	75.10 ± .32	77.79 ± .36
Difference	-4.96 ± .33	-5.27 ± .40
Nine of the women reported at one and at five o'clock on the same day a total of 77 times. The results were as follows for the reclining position:		
Mean Systolic Pressure		Mean Diastolic Pressure
1 P. M.	112.14 ± .71	68.83 ± .41
5 P. M.	112.66 ± .71	72.14 ± .40
	+ .52 ± .62	-3.31 ± .53

A study of the relationship between the systolic pressures in the two positions at one o'clock gives a correlation coefficient, r_{R,S_1} , of .821 ± .017, in which, as above stated, R is the pressure in the reclining position and S the pressure in the standing position. The linear regression equation, calculated from the means, standard deviations, and correlation coefficient, is $S = 28.19 + .74 R$. The empirical mean standing systolic pressures for each class of reclining pressure are plotted on the scale of ordinates against the reclining pressures in Graph 1. The relationship between the systolic pressures in the two positions at five o'clock is measured by a coefficient, r_{R_5,S_5} , of .824 ± .020. The linear regression

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†All pressures are expressed in mm. Hg. The following designations are used: R_1 —pressure in the reclining position at one o'clock; R_5 —at five o'clock; S_1 —pressure in the standing position at one o'clock, S_5 —at five o'clock.

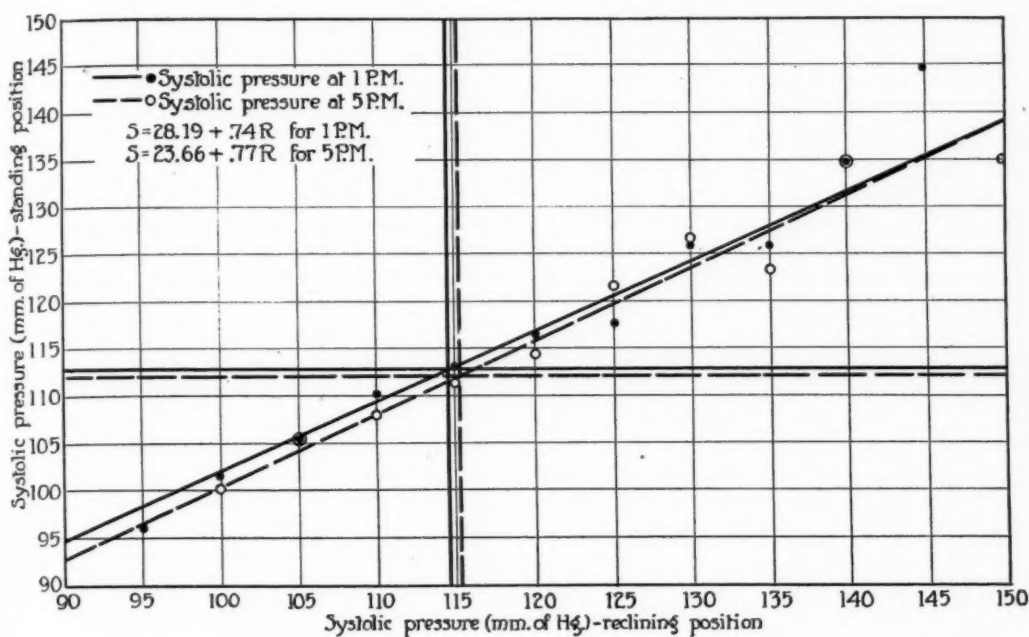


Chart 1

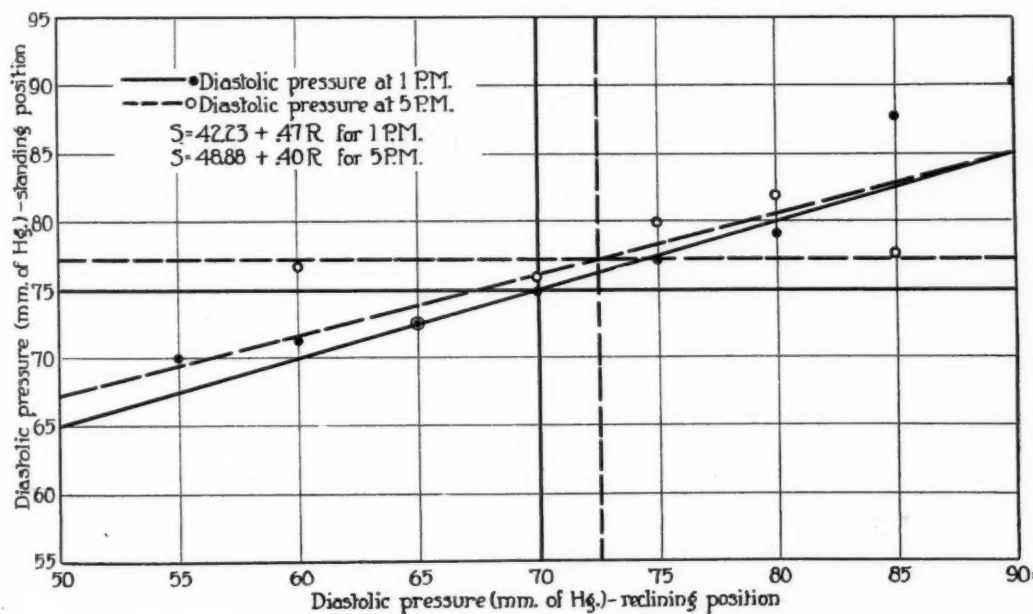


Chart 2

equation is $S = 23.66 + .77 R$. The results are laid beside the results for one o'clock in Graph 1. The regression lines for the two series are essentially identical.

The relationship between the diastolic pressures in the two positions at one o'clock is expressed by a coefficient, $r_{R_1S_1}$, of $.450 \pm .040$; the linear regression equation is $S = 42.23 +$

.47 R. The results found for five o'clock are a coefficient, $r_{R_1S_1}$, of $.396 \pm .053$, and a linear regression equation of $S = 48.88 + .40 R$. Graph 2 presents these results.

The systolic pressures in the reclining position at one o'clock are related to those in the same position at five o'clock on the same day as measured by a coefficient, $r_{R_1R_5}$, of $.620 \pm .047$. The diastolic pressures in the reclining position at one o'clock bear little relation to those in the same position at five o'clock on the same day. This is expressed by a coefficient, $r_{R_1R_5}$, of $.138 \pm .076$.

CONCLUSIONS

1. The mean systolic pressure is significantly higher in the reclining position than it is in the standing position, within the time limits previously given.
2. The systolic pressure in the reclining position

is correlated closely with that in the standing position.

3. Mean systolic pressures in the reclining position were found to differ by insignificant amounts between one and five o'clock on the same day.

4. The mean diastolic pressure is significantly lower in the reclining position than it is in the standing position, within the time limits previously given.

5. The diastolic pressure in the reclining position is not closely correlated with that in the standing position.

6. The mean diastolic pressure in the reclining position is significantly higher at five o'clock than at one o'clock on the same day.

We desire to express our gratitude to Prof. J. Arthur Harris for valuable criticism in the preparation of the manuscript.

We are also grateful to the students who made this study possible.

PUBLICITY AND THE PRESS*

ARNOLD DAANE

Editor of the Austin Daily Herald

Austin, Minnesota

I AM afraid I am going to speak on a subject that is a tender spot among the medical men. Mr. Brist said something about the ease with which you may obtain a license for massage. I have no such license, but in massaging this tender spot, I hope I am not going to rub the fur the wrong way.

Publicity paints mental pictures. I had such a picture painted for me when I was in a tender age. There was a picture of a doctor, and I presume no matter what I read, I will always have that picture in mind; possibly you have seen the same picture—a painting which twenty-five years ago was in the homes of every town. The title was "The Doctor." It showed a child lying upon a cot of rather a humble home, undoubtedly the home of a poor man, certainly not that of a rich man, and a woman sat with an apron covering her teary eyes. There was, too, an old gentleman—and always that gentleman will be to me a picture of the medical profession. That old gentleman was a comforter, and I always regard the doctor as a comforter. I presume a lot of families have seen that picture, which I know my grandmother handed down to my aunt, who gave it to my sister. That picture was publicity. I imagine if you should say that to the painter, he would be offended. The picture is idealistic, it paints a picture of things as they should be, yet that picture gives you no impression of a medical man as a scientist. It doesn't give you a picture of a medical man setting fees and conducting the audit of his account, or, for that matter, coping with a problem of publicity. You don't find it in that picture. That picture is the true picture—the publicity for the doctor as a whole. A doctor doesn't object to publicity as a whole, but to individual publicity.

But there is other publicity, of enlarging your acquaintances, and between the time that a doctor first puts himself in his chair without a patient, and the time when he is a successful practitioner,

there has been some publicity operating in the meantime. Now, it would appear that it is newspaper publicity the medical profession picks as objectionable. But there are other means of publicity. I can remember sitting in a moving picture theatre in a small town, looking at a picture on the screen. There all the art of the movie director had been put on that screen to arouse the emotion of the people sitting in the theatre. They are waiting for a story to unfold, and just before the climax is reached, in walks an usher, "Is Dr. Smith in the house?" Possibly you have heard that. Now, an advertising man would recognize that as exceptionally good publicity. Here you have five to seven hundred individuals, their emotions aroused, they haven't heard a word spoken for possibly hours—they will pause in their interest in the picture to wonder about the poor devil who needs Dr. Smith.

As a reporter, too, I have occasionally discovered something else. Feeling that I might overlook a story, I have slipped to a telephone, and found there was no need for calling Dr. Smith. Other times I dashed madly to the hospital or other designated spot, and found there no need for the doctor.

Surely a physician needs publicity. It isn't merely his medical profession for which he is responsible. He is also responsible for his individual success. I don't know what is supposed to constitute good medical publicity. If a physician is successful and someone tells it to someone else—word of mouth publicity is all right. I can't admire you gentlemen very much for relying on rumor as a type of publicity.

There is something about human nature that demands either news or publicity. If the newspaper doesn't print it, rumor will get it, and, to tell the truth, rumor hasn't been very kind to you gentlemen—not nearly as kind as newspapers have. I have to go back in our newspaper file a long way to find one where my paper said anything really mean about an individual doctor. In our town a resident was walking along the

*Address given before the Conference of Secretaries of the component societies of the Minnesota State Medical Association, St. Paul, Feb. 23, 1929.

street, and suddenly had an attack of apoplexy. Several people saw him fall. There was a young doctor starting out in his profession, and they rushed and called him out, but the man was beyond medical attention, and he died a few moments after the attack. The newspaper printed the account, and printed the name of the Doctor, but said—"The Doctor gave him some medicine, and in a few moments he was dead." Now that's mean. I have to confess that, but I have heard rumored a lot meaner things. I know, because in the newspaper profession rumor is pretty much a competitor of news.

I remember a rumor about a physician in our town, which I as a layman could readily have explained. There seemed to be an epidemic in town of a disease which broke out on the face. This doctor, I presume, prescribed something like mercurochrome and he put it on the spots on the face of the patient, which appeared to have a pretty good effect. One patient would go to him and get some results, and someone would notice it. In a little while this doctor had quite a number of patients. That doctor was putting his advertisement on the face.

You seem to insist upon referring to publicity in a news story. The stock story man isn't particularly anxious to quote the name of a doctor insofar as that is mere publicity. He knows that his subscribers aren't sitting anxiously waiting to find out what doctor attended a case. But there is a reason why he does put it in. First, he gets his price attached to a good news story. The price of this story may mean more than the story can afford for a column of news. And it may mean printing the name of a doctor in connection with a story. We are dependent upon tips in getting a good story. We are dependent upon the physicians to help put that news together. If he printed the name of a doctor in connection with a story, he has more chance of getting a news article.

We have had little accounts come into the office from doctors' offices, and the name of the doctor in connection with the comments, with the request that we use them just as they have been written. Now, I don't know how you think we diagnose this objection. We have our own explanation. We feel it is the Medical Association, not the individual doctor, that objects.

There is a good rule that says "the whole is greater than any of its parts." This is true, but

we are not responsible for the whole, and we have to deal with the parts, because we are relying upon them to furnish us with a certain type of news. But, as I said, I never heard a doctor object to publishing his name in an account in a good news story. I have heard doctors complain, possibly not openly, about the name of some other doctor in connection with a news story, and I presume that we are left to assume that it is a matter of distribution; that the newspapers don't show any equality in allotting your publicity. I think that is something that is hard to remedy. As a newspaper man I realize that in connection with a newspaper story there is doubtless publicity. I realize that publicity has been a by-product of that news story, and it is very much like healing and paying. Now, you can't equalize news stories and publicity in news stories. Publicity and news don't fit in the same dimension. They are like two boards of unequal lengths.

Some people have a knack of getting more publicity than others; just as some people have a knack of getting more of anything else than others. It merely happens that way. You gentlemen, as practitioners, know that man is not created to remain equal.

There is a certain type of case that does make good news, the industrial case or the accident case. That situation will always exist. Another trend that will demand more publicity in the future is the general interest in health. We are becoming more interested in health than we used to be. We talk health, we read and eat health, and in this age of short nights and long days, some of us even sleep health; and a newspaper, recognizing that extended scope of news, is going to indulge more in the matter of health. More daily newspapers and more weekly newspapers are publishing medical columns, or health columns as they call them, and in that the names of physicians are quoted quite frequently, because the names of physicians do mean something too in news contributions. That is one phase.

There are medical men who have added to the achievement of medical science. Where a man is nationally known in the medical profession, he is always locally known in his town. What happens in a community is of just as much importance to the community as a thing that happens in a nation is to the nation. I believe that

community will become closer knit if the community newspaper gives the local people the full share of their due.

I know of two or three incidents that happened in our snowbound district, where there was something in the nature of heroics performed, to people that needed medical attention. You people possibly take that as a matter of routine. The doctors said nothing to me about it. I think that sort of thing is something that may interest the people. It might give added publicity to and added understanding of your profession. I don't know why we couldn't get together on this sort of thing. In your Association you appear to stress the doctor, rather than a doctor; to stress medical science and the medical profession, rather than the individual practice of a member. We are not in position to rob the doctor of his individuality and weight of news, and I presume we never will. I haven't anything to offer by way of suggestion. I feel that there is going to be news about medicine and about doctors, and in connection with this news there is also going to be publicity.

We were sent a rather peremptory notice from our local medical society. It was rather brief, merely requesting us to refrain from publishing the names of physicians and also the name of the medical society. I didn't happen to be per-

sonally connected with the incident, but my partner reacted with about two columns, with the names of all the physicians carefully inserted. I believe there was not one name omitted. It wasn't so much a matter of freedom of the press on which we insisted when we wrote that two column article; it was merely a matter of community interest. We feel in our little community we have to do something to keep it on a par with the larger communities. We print the names of eminent physicians. We print their standing, their utterances and we would like to understand why we shouldn't print the name of a local physician. I really don't think that a resolution, directed to the press, is going to do a great deal of good. They possibly can do something in the matter of keeping objectionable publicity out of the paper. Possibly resolutions might do something to eliminate the quacks. Possibly the newspaper is making duck soup out of quacks. But I think we are going on just the same, and I imagine all newspapers will go on just the same in printing the doctor's name. We haven't much to offer at any rate, as a solution of the problem, but we have something to request—we might ask that you gentlemen be more liberal in giving your names to the newspapermen.

PRESIDENT'S LETTER



THE PUBLIC HEALTH NURSE

A short time ago a committee of the society appointed by the Council met with a group representing the State organization for public health nursing. Many interesting facts were brought out regarding the public health nurse and her relation to the community which she serves, as well as to the physician in her district. Modern methods have transformed the old type of visiting nurse into the present day public health educator, whose function is largely that of demonstrating to those whose privilege it is to serve, how to keep well rather than as an aid to recovery from illness.

Just as soon as a community understands and appreciates her attitude she is of necessity a welcome visitor. It must be understood, however, that in addition to a thorough nurse's training, she must have the ability to intelligently and impressively present to her people the simple facts of hygiene and right living in such a way that they will carry conviction and be properly acted upon. She should also stress the importance of medical examinations and the early and prompt resort to medical aid in even what may seem at first to be only trivial indisposition.

The properly trained public health nurse neither attempts to diagnose nor prescribe but is ever ready to assist in carrying out the doctor's orders and to instruct and aid in every way where help is needed.

According to expert opinion there should be approximately one public health nurse to 2,000 population in order to meet the community health needs adequately. In Minnesota there is one nurse to about 3,000 people in the urban sections. In the rural communities there is one nurse to approximately 24,000. It is obvious that the emphasis of development in public health nursing should be in the rural areas. There are 38 counties in Minnesota that have no public health nurse of any kind. There are 61 counties with no county-wide nursing service. There are 392 public health nurses in the state today, but only 120 are outside of the cities.

Results are largely measured in terms of improved personal and community hygiene, better health habits, correction of defects, reduction of prevalence of communicable disease, etc. In response to a questionnaire sent to Superintendents of Schools, a year or so ago, all of those who replied spoke in favor of the school nursing service and pointed out the accomplishments along health lines which were made possible by the service. Dr. J. A. Meyers, President of the M. P. H. A., who has coöperated very frequently in the conduct of clinics throughout the state, has often said that a large degree of the success of the clinic depended upon the efficient preparation, assistance, and follow-up of a qualified public health nurse. A study in New York City showed that only 6% of the school physicians' recommendations were carried out before the introduction of the school nurse. With their help this percentage was increased to 80 per cent.

May we venture the hope that the time is not far distant when a more thorough and complete understanding of the public health nurse and her activities may bring about a greater coöperation among school authorities, social service groups, and the medical profession in Minnesota?

THE CONSULTATION BUREAU

The impression that this bureau would consist of the committee named in the President's letter of last month has given rise to some misunderstanding. It should be clearly understood that this group is merely a sub-committee working with Dr. O'Brien and Dr. Meyerding in developing the details and plans of administration.

The Consultation Bureau is an enterprise fostered by the Medical Educational Committee of the State Association and now has an extension course faculty of approximately three hundred specialists and it is the plan of the committee that this group will furnish the nucleus of a consultation staff for the Bureau although Dr. O'Brien will feel free to call upon any member of the Association for an opinion.



EDITORIAL

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STATE MEETING

Seven outstanding speakers from out of the State, a scientific program one half day longer than a previous meetings, an Open Forum luncheon for the public, a medical economics session of unusual interest and importance, and excellent entertainment and exhibits are features of the sixty-first annual meeting of the Minnesota State Medical Association to open at the Masonic Temple, St. Paul, May 13.

Headlining the program are the following out-of-state speakers: Dr. Elliot Proctor Joslin, Boston, Professor of Medicine, Harvard Univer-

sity; Dr. George P. Muller, Philadelphia, Professor of Clinical Surgery, University of Pennsylvania; Dr. William Engelbach, Endocrinologist, formerly with Washington University, St. Louis, now on leave of absence to write a book; Dr. Arthur L. Chute, Associate Professor, Genito-Urinary diseases, Tufts College, Boston, Mass.; Michael M. Davis, Ph.D., Chicago; Dr. Morris Fishbein, Chicago, Editor of the Journal of the American Medical Association; Dr. Kellogg Speed, Chicago, Associate Professor, Clinical Surgery, Rush Medical College, and Dr. G. A. Skinner, Surgeon, U. S. Medical Corps, Fort Omaha, Nebraska.

To make possible an additional half day of scientific program, the Ramsey County Medical Association has arranged for clinics opening at 8:30 A. M. Monday, May 13, followed by a luncheon at which the Ramsey County Society will be host to delegates. Details of the clinics will be found in the program printed elsewhere. The Council of the State Association will convene at 10:00 A. M. on the opening day in the Blue Room of the Masonic Temple, and the House of Delegates will meet in the afternoon.

A request Clinic on Fractures, the choice subject of the majority of physicians of the State according to a post-card ballot, will start Monday P. M. at 1:45, opening the State scientific program. A fine symposium covering various phases of the subject has been arranged.

Cost of medical care, a topic of vital interest to every physician, will be the theme of the Medical Economics meetings Monday night. Dr. E. A. Meyerding, Secretary of the Minnesota State Medical Association will preside at this session, which will be held in the Masonic Temple auditorium, starting at 8 P. M. Speakers include: Michael Davis, Ph.D., Chicago, who under the Julius Rosenwald Fund is making a thorough study of this subject, Dr. Morris Fishbein of the American Medical Association, and Dr. O. E. Locken of Crookston. Review of legislative work in Minnesota will be given by Dr. Herman M. Johnson, Dawson. Members of the Women's Auxiliary will present a skit, "Better Halves," the cast of which has been chosen from people

with stage experience. All physicians and their families are urged to attend this meeting.

Dr. Elliot Proctor Joslin, of Harvard, will lead a symposium on diabetes, which will open promptly at 8:30 A. M., Tuesday. Dr. Joslin will start the session with an illustrated lecture on "Treatment of Diabetes."

Dr. Chas. H. Mayo of Rochester and Dr. Joslin will lead the discussion in the symposium on goiter scheduled for Tuesday afternoon. Dr. Mayo will take the surgical phases of the subject, and Dr. Joslin the medical.

To give the public an opportunity to hear the visiting speakers an Open Forum luncheon meeting will be held at the St. Paul Athletic Club at 12:30 P. M. Tuesday. Speakers will include Dr. G. A. Skinner, Surgeon Seventh Corps Area, U. S. Medical Corps, Fort Omaha, Neb., Dr. Charles Mayo, and Dr. Joslin. It is expected that many physicians will attend this luncheon.

Few speeches and much entertainment are promised for the banquet meeting Tuesday night. Dr. R. C. Farrish, Sherburn, will be toastmaster, and brief talks will be given by the State President, Dr. J. T. Christison, St. Paul, and Mrs. Ben Davis, St. Paul.

A large and worthwhile display of scientific and commercial exhibits have been planned for the meetings. Among those presenting scientific exhibits are the Minnesota State Board of Health, the University of Minnesota and the Medical School. Noonday movies are an additional feature of the program.

Program of the Women's Auxiliary will start Monday afternoon at 2:30 with a meeting of the Executive Board. Entertainment features for the visiting physicians' wives are being planned by the Ramsey County Auxiliary.

Stating that the scientific program for the sixty-first is one of the best in the history of the organization, officers urge that every physician who can possibly arrange to attend the sessions, do so.

THE HEART COMMITTEE OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Owing to the striking increase that has occurred in the death rate from cardiovascular disease in this country during the last twenty years and owing to the fact that the problems of heart

disease have been so emphasized during the last few years, the Minnesota State Medical Association appointed a committee to investigate the problem of heart disease.

These problems are numerous and the Committee perceived that it must proceed with caution; therefore, an attempt has been made to formulate a plan of approach. The coöperation of the medical profession in the state was necessary to success and it seems that since the Committee is an integral part of the State Association full coöperation can be anticipated.

In many states the problem of preventive cardiology has been taken up in various ways, some of which have been commendable and others of which are subject to serious question. In some states the problem of preventive cardiology has been undertaken by lay organizations. In this state it has been felt that until a more definite manner of approach has been determined control of the situation should remain in the hands of the medical profession.

Preventive cardiology must confine itself largely to the coming generation, as there is probably relatively little opportunity to accomplish much along these lines among adults of the present generation. Definite vital statistics in Minnesota are necessary and if they are to serve as a basis of further study a uniform nomenclature of heart disease is needed. Only by these means can the mass of collected material be accurately analyzed on an etiologic basis, and etiology is the crucial point in analysis of vital statistics.

The Committee plans on making available to the various county and district medical societies, speakers who will give talks on the various problems relating to the subject. This phase of the work will be carried on in conjunction with the Extension Division of the University of Minnesota.

It is planned to present a cardiac exhibit at the coming meeting of the Minnesota State Medical Association in St. Paul. The Heart Committee will be glad to have any member of the State Association submit material that could be used in making a comprehensive exhibit. Dr. Douglas Head, Donaldson Building, Minneapolis, is Secretary of this Committee and any communication dealing with the Heart Committee should be addressed directly to him.

THE HEART COMMITTEE.

PHYSICIANS' INCOME SURVEY

From time to time one hears statements about the average income of physicians. Some of these estimates are ridiculously low and some fantastically high. There seems to be a very general idea that physicians never need to worry about their incomes and as a result the physician's bills are frequently the last to be paid. As a matter of fact, no comprehensive survey of the question has ever been made and the statements made are mere opinions.

A survey published by *Medical Economics* (March, 1929) gives the results of 1,000 questionnaires returned by physicians scattered all over the country. From this survey the average income is placed at \$5,806 with an average practice of nineteen years. The net incomes show variations from \$3,284 in rural districts to an average of \$7,125 in metropolitan centers, the increase keeping pace with the size of the community. The expense of practice showed a corresponding increase from an average of \$2,445 in rural practice to \$4,357 in cities of 50,000 and upward, the figures being slightly less in metropolitan centers than the highest figure (centers of 50,000 and upward). As is to be expected, the ratio of specialists to general practitioners increases within the larger centers of population and the incomes of the specialists average higher than in general practice. A thousand questionnaires is scarcely a large enough number to make the survey satisfactory.

A study made by the Alpha Kappa Psi fraternity for the year 1926-1927 entitled "The Relation of Education and Income" is interesting reading. The conclusions drawn from nearly 8,000 returned questionnaires are that by the age of 60 the high school graduate has earned \$88,000 on the average or \$24,000 more than the man without high school education, which makes the high school training worth \$30 a day. Likewise the college graduate by the age of 60 has earned \$144,000 or \$56,000 more than the high school graduate, which would make each college year worth \$14,000. From this survey, the average man at 45 with only an elementary school education earns \$1,700 a year; with two years of high school, \$2,000; and with four years of high school, \$2,600. With returns from only 141 lawyers and fifty-eight physicians the conclusions drawn are scarcely justified.

The survey being made of physicians' incomes by the A. M. A. is national in its scope and should give an accurate picture of the actual income and expense of practice in this country.

We have yielded to the temptation to make a similar survey of the incomes of physicians in Minnesota. Unless there is a general coöperation on the part of members of the Association no reliable conclusions will be forthcoming. We shall attempt to determine mainly net incomes and the present day expense associated with practice. Care should be taken in filling out the form not to include automobile expense, for instance, if it is not used for practice. Every physician has figures for his 1928 income tax at hand and although one is loath to fill out any unnecessary forms, members of the Association are urged to coöperate to the extent of filling out the questionnaire which appears on page xxvi (advertising section) and returning it unsigned to the office of the journal. A few returns have already been received following the publication of the questionnaire in the journal last month. Duplicates, of course, are not desired.

HISTORICAL COMMITTEE

Do you know, or do you remember, the first medical journal published in Minnesota? Who was the editor and publisher? How many different journals have been published in our State? Well, we know about them, and have seen and read some of the contributions in them, and they are interesting too. We would, however, like to know more about the "Minnesota Medical Mirror," published from 1881 to 1885 in Cambridge City, Minnesota. We have one copy only. The editor and publisher was Nerius M. Cook, M.D. We heard that he went to Duluth after he left Cambridge. Can't some of you men in Isanti County give us some information? Heretofore we have been honest enough to ask only questions we could ourselves answer; now we are giving you a chance. Local Sherlock Holmes will please get busy. Our fountain pen is not dry yet. Can you stand more?

To conclude, and again stress the main point, Dr. H. M. Workman, Tracy, Minnesota, will be the recipient of all information you may send in.

J. M. A.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

It has frequently come to our attention that various local and state associations pass resolutions asking recognition by other groups. Many insurance companies, railroads, industrial concerns, etc., have as a requirement or give preference to the members of organized medicine.

We are publishing two letters, one sent out by a State Medical Association and the other a reply from a large insurance company. While we do not agree with the insurance company in every respect, nevertheless, it calls to our attention certain facts that you will remember when we consider topics of this character.

"At a recent meeting of the Executive Committees of the State Medical Association the subject of Medical Examinations of Life Insurance applicants came under discussion. Among other things it was brought out by one physician of the group that at present a great many examinations are being made by physicians who are not identified as members of the County, State, or American Medical Association.

"Inasmuch as the most scientific and progressive men in the medical profession are members of their State Society, and inasmuch as it is fundamental with the Insurance Companies to have their medical examinations made carefully, thoroughly, and honestly, and inasmuch as both the Insurance Companies and the Medical Associations have much in common in the interest of the public's welfare, we feel at liberty to ask you to take under advisement this error in coöperation.

"After consideration of this matter I hope you will be able to inform me so I in turn may notify the rest of the membership, that in the future all Medical Examiners for your company will be appointed from the membership roll of the State Medical Association."

My dear Dr.:

"Your letter addressed to the Secretary of this Company under date of January 29th has been referred to me. I assume that this is a form letter which has gone out to all insurance companies doing business in the state of

"In order to make our position clear to you, I am glad to inform you that wherever we can find a man who is otherwise qualified and who is a member of the County, and State, and American Medical Association, we always give him preference in our appointment. We do this because we feel that the better men are much more apt to be in the legitimate and recognized medical association.

"However, I am sorry that a letter of this kind went out to all of the insurance companies as I very much fear that it will make a very unfavorable impression upon them as regards the propriety of such action by the State Association. Your Committee practically makes a demand upon insurance companies that they should employ no other men in the State of than are represented in your organization.

"As sincerely interested as I am in perfecting the organization of the medical profession, I think a demand of this kind is a mistake and will be more apt to antagonize a business organization than to obtain their coöperation. You infer that all of the honest and competent physicians of the State of are members of the State organization. I wish very much that this was true, but I doubt if it is true for any of the State organizations. We certainly could not commit ourselves to the definite assurance that we would never use a physician who was not a member of the State Medical Association, and I believe that on reconsideration you will agree that this is not a proper request to make of us.

"Suppose, for example, we were doing business in a town in which there was no member of the State Medical Association practicing medicine. Should we therefore withdraw from that territory? Suppose, for another example, we had found that our regular appointee, who was a member of the State Medical Association, was rendering us either incompetent or dishonest service and we had to discontinue him and the other practitioner in the town was not a member of the State Association, what course would then be open to us?

"If you will refer to the last edition of the American Medical Directory, and run down the first column of you will note that there are four towns in the first column under 'A's' in which no practitioner in those four towns is a member of the State or American Medical Association. In the second column, there are five towns and I assume that probably a somewhat similar proportion throughout the state.

"I am intensely interested in seeing the physicians of the country and respective states thoroughly organized, and, as a matter of fact, I am a member of the Committee in the State Medical Association which you represent as Chairman in However, I do not like to see the profession take a method which might be misinterpreted as smacking too much of trade union methods. I fear the reaction of such methods from the point of view of the public, and especially business houses, would be inclined to prejudice them against the organized profession rather than impress them favorably.

"I trust you will pardon this frank expression of personal opinion."

MISCELLANEOUS

REPORT ON ANNUAL CONGRESS ON MEDICAL
EDUCATION, MEDICAL LICENSURE AND
HOSPITALS*E. L. TUOHY, M.D.
Duluth, Minn.

It was my privilege to attend the conference of the American Medical Association on Medical Education, Medical Licensure and Hospitals, held in Chicago, in February, 1927. I attended as the invited representative of our State medical association, and at the suggestion of the then acting president, W. F. Braasch. This year I attended because of certain responsibilities on the program. I was again impressed by the unusual earnestness shown in the various sectional programs; the deep and serious work of the American Medical Association and its officers; the large number of men who yearly travel such distances in order to exchange ideas and determine our most useful administrative procedures. At that time I summarized some of the discussion and published it in *MINNESOTA MEDICINE*. Most of the papers read are ultimately published in the *Bulletin*, but since a good many do not read this valuable brochure it seems worthwhile to review again for our readers this meeting.

LABORATORIES IN HOSPITALS, IN PRACTICE AND IN
MEDICAL TEACHING

Hans Zinsser, M.D., Professor of Bacteriology and Immunology, Harvard University Medical School, Boston, stated that the enormous increase in objectivity in diagnosis has greatly emphasized the position of the laboratory (term used in its broadest sense), and according to the writer and Wilbur, there has been not a little distortion. The suggestion obtrudes that impersonal clinics may displace the individual. However, the present issue seems to be to develop those who may correctly interpret the objectivity, which is the product of all laboratories.

Raymond Pearl of Hopkins is quoted as having stated, "America likes both its high ideals and its liquor; it proclaims temperance with the former and encourages bootleggers with the latter." In some such manner, a rich country is said to be able to afford whole-time teachers and researchers. In any case, they sense the danger in a plan which may have as a by-product the creation of "medical mechanics." Zinsser, who states that he is "not a radical but a violent modern," wants our students in medicine to know the fundamentals and to grasp the principles of logic. He asks teachers even in science to lose some of their "syntax grinding and pedantry." He asks the public to know enough of medical science to know that "the islands of Langerhans" are "not in the South Pacific!"

As to the much mooted question as to how laboratory men (pathologists—and the same applies to roentgenol-

ogists) shall be suitably and sufficiently rewarded: certainly he maintains that they must be men of vision—not "Methodists in a wine cellar—incurious and perfectly sober!" Neither should they be "trained seals—taught to ring a bell, for which they are given a her-ring!" To have capacity for teaching research and correlation they must have contact with scholarly minds; "the beginner must be taught, not by the dilettante, but by the very wisest; automatus routine stifles not only individuality but useful output."

One speaker had another plan to aid researchers: "It may be needed in America to teach our heiresses to marry scientists instead of dukes." A word of caution was extended to those entering salaried positions anywhere—beware of "blind alleys—leading no place in particular, and, as far as professional activities are concerned, fostering activity developing the individual for capacity or use only in some very specialized environment or unusual connection." Dr. Rappey again stated that fully 50 per cent of the graduates of our Class A schools enter into salaried positions.

In the conference on radiologic laboratories, much attention was given to the professional position and the emolument or financial return due the radiologist. The hospitals, their superintendents and managers, came in for a great deal of criticism because of their attempts to dictate, direct, and possibly exploit, the roentgenologist, or to use the department to build up their revenue. In any case, the right kind of a man greatly increases the value, the output and the utility of the hospital department. The same can be said, of course, of those in other departments, like pathology, physiotherapy, etc.

"There are indeed few pathognomonic signs; any one exclusive interpretation may be unsafe." One is left with the feeling that they deserve support and that they are entirely willing to establish the kind of co-operation that reasonable doctors want.

Dr. P. M. Hickey of Detroit presided at the special radiologic session.

The very well known Dr. James T. Case of Battle Creek, in discussing the papers of Dr. A. U. Desjardins of the Mayo Clinic, Dr. Charles L. Martin of Baylor hospital, Dallas, Texas, and Dr. Wm. E. Chamberlain of Stanford University hospital, San Francisco, Calif., stated correctly that the papers were "quite masterpieces."

Desjardins pointed out that in the period following 1895, when Roentgen made his first announcement, there has been a rapid scramble, with much evidence of the same distortion in application of the science, as was commented on by the other speakers in the realm of laboratories in general.

In discussing the nomenclature—use of terms (skiagraphy—roentgenography—radiography)—it was pointed out that the use of radium following Becquerel and the Curies left a certain amount of uncertainty. These two forms of rays have kept farther apart than their common properties justified.

Everyone commented upon the absolute need of more thorough organization of x-ray work in practice and in

*Meeting held February 18-20, 1929, at Palmer House, Chicago, Ill.

hospitals, and the need of coöperation between roentgenologists and other specialists. (See editorial, MINNESOTA MEDICINE, April, 1929, p. 226.)

Another question was introduced in terms of the work of roentgenologists in hospitals and the application of ultra-violet light. Having entered upon this field of the use of the ultra-violet light it is only obvious and natural that the directors of the *x*-ray laboratories must have certain contacts with other forms of light treatment not necessarily having notable penetration powers. The usual "hocus pocus" of physiotherapy was mentioned. "X-ray men must not live in a world of shadows; any announced *x*-ray specialist should have good grounds for his announcements. Up to date the state and federal governments have no mechanism to safeguard and keep up to a certain standard all men entering specialties, so in the meantime each group must keep its own house clean." He might have said that this is the great work of many of our special societies. It is easy to see that anyone practising as eager, vivid and dynamic a profession as ours must constantly "make up his hand," even as the good "Rummy" player must do.

Many shortcuts in our approaches must be devised; we must not allow precedents to keep us from re-vamping our schemes either for research, for routine diagnosis or for coöperation. If good men are going to come into roentgenology, however, they must see a career before them equal to that in other associated lines. Apparently these men hold strongly to the feeling that "few internists and surgeons know the possibilities of roentgenology."

Charles L. Martin, speaking of equipment, stated that the recent transactions of the conference at Stockholm had an excellent résumé on the question of protection both of the operator and the patient. This should be consulted. While technicians may be able to do a good deal, they are certainly not competent in the judgment of films, and should never trifle with fluoroscopy.

It was suggested that in each hospital each radiologist bring together "a museum of films especially designed for teaching purposes and reference." It is obvious to him that a great deal of improperly ordered *x*-ray work yields no useful purpose. Few roentgenologists are well trained in the matter of therapy. Like the pathologist, they must be able to teach, to stimulate interns to take part in conferences.

Dr. Chamberlain discussed without heat the growing invasion of commercial laboratories, and stated unqualifiedly that their success and development depended entirely on other practitioners of medicine. We should not ask for laws to keep out these commercial laboratories, but we should expect the profession of medicine to "keep its own house clean." There can be no equivocation on this point. Some of the reasons given for the development of these laboratories are the failure of the average doctor to value the consulting capacity of the roentgenologist, or his general dislike to consultations in general. Probably some might state that there were no available high grade and well trained men. Many hold, however, that the use of *x*-ray is

entirely "a series of technical procedures." "Some blame the system of charges, and think that mere photographs made of celluloid "should be charged for by the square inch."

Professor Wm. A. O'Brien, of our own University, dealt with the subject of clinical hospital laboratories most effectively. He indicated the growing concept of the term "pathologist," and made it clear that it covers a wide series of efforts, both in clinical medicine, in teaching and in hospitals. Certainly it has outgrown the dead house, and has come to include much that is physiology. It should not be split up unduly into regional zones or segments.

In presenting his ideas of what a qualified pathologist should be able to do, he brought out the following:

1. He should be able to do a good necropsy and make a good report upon it. In the matter of time, choosing a place for the work, and having others present with him, as well as in general principles of technic, it was his belief that the whole matter should not be lackadaisical, indifferent, done in a slovenly manner or without system.

2. In the matter of surgical tissues, it was his belief that the very widest experience was essential, and in giving reports on tumor tissues, exudates, etc., it was not beyond the province of the pathologist to indicate broadly certain principles pertaining to therapy and prognosis.

3. The pathologist should be able and willing to briefly abstract clinical histories, and file them away with the autopsy reports—a virtual "synopsis of all the chapters in the life cycle of the disease." Except in certain unusual circumstances, a report should be sent to the family.

4. The pathologist should have the broadest concept of bacteriology, and be able to deal with the technic and with the general subject intelligently.

5. In addition, he must have contact with biochemists or have good technicians available who have been trained by him. This is essential "unless much of our clinical application of the newer physics and chemistry is entirely misapplied."

6. He should be able to handle successfully, to teach and coöperate with "morticians." The details need not be added here.

7. Finally, he should have some research ability—"he should not be the solemn, introspective type, but should have the instincts of scientific advancement and interest in its methods."

He showed a curve of the percentage of autopsy permits, based upon the type of man in different hospitals, his health, his initiative, and the extent to which he has grown into his job. This curve is most instructive.

He commented at some length on their course for technicians, now tried over a four-year period in Minnesota. They have seventy-seven young women now enrolled. These "practitioners of medical technic" are being very well received, and at a time when women are yearning, searching about and investigating, in order to find the place for their talents, this field is worth considering.

8. While we are discussing the question of hospital cost, laboratory needs and proper supervision, we should not forget that "doctors need a good deal of instruction as to the proper way to use the laboratory." We might say the same regarding any other hospital facility.

Dr. Ralph Kinsella of St. Louis, well known on account of his researches on arthritis, its bacteriology and experimental course, continued the discussion on hospital laboratories. His comments dealt chiefly with "the control and support of hospitals and their laboratories largely catering to private physicians." He pointed out that the early efforts of the American College of Surgeons in its standardization program did much to eliminate the risk of private patients in private hospitals. He went into the question of the minimum requirements of the American College of Surgeons, and wished to draw attention to the expansion in these minimum demands or requirements that would be proven to be worthwhile:

1. He would ask for a certain additional clinical examination of the blood—also for a Wassermann reaction.

2. He would ask for a routine x-ray of the chest, with natural emphasis upon the heart and lungs. He pointed out that where this was done a very definite increase in the diagnosis of pulmonary tuberculosis (50 per cent) had occurred over that in a similar hospital where this routine was not considered. Certain heart lesions—unexpected—were also uncovered.

They have experimented with varying flat rates for not only laboratory hospital work but also for certain roentgen work. They began with a flat laboratory rate of \$5.00 but he felt that the rate could be reduced, and presently for the obstetric department it was \$2.50.

In the establishment of all these rates there was at first a considerable complaint—usually from the doctor, and rather rarely from the patient. Now nearly everybody accepts it without question.

The result of these flat rates and far more routine work, has helped everybody "to appreciate the obligation of the hospital toward its patients; to do for them more than was actually demanded; to elevate the hospital in the opinion of the average practitioner; to provide a source of education to the staff; to help in training and orienting its interns; and, most of all, to obtain the confidence of the public."

Of course the plan has called for a considerable increase in the number of technicians, but, on the other hand, it has greatly decreased their bookkeeping and collection difficulties. In general, the routine x-rays of the chest have yielded more surprises than have the routine tests of the blood. In both the clinical and the roentgen laboratories no additional burdens have been imposed, despite an increase of 50 per cent in the work.

In the past, something like 30 per cent of the people have paid for 60 per cent of the laboratory work—the flat rate tends to accomplish a more equitable distribution.

THE PROBLEM OF EDUCATION

Many critics observe that technic in education has

had little consideration in medical schools. David A. Robertson* did not make this statement, but directed his paper to an analysis of the three great professions and how they are recruited. Harry Emerson Fosdick, in referring to his own group, is quoted as stating that those in Theology today "seem to desire to live in an unchanging world." Truth in any form need not be feared by any religionist. The fear is with mounting costs for all professional education that incompetency, backed by money, may get in, while genius hustles to live in lines of common labor. Can worthwhile intelligence tests be applied? Robertson feels that "achievement tests" as worked out at Georgetown University promise more.

Louis B. Wilson, of the Mayo Foundation, in reviewing the results of "careful quadrennial examinations" of five hundred men at the Foundation, finds that there was a definite relation between the ratings of these men in their various medical schools in terms of the four primary branches of Anatomy, Physiology, Physiological Chemistry and Pathology. However, while fifty-one medical schools were represented, no one school seemed to have grounded all of its men equally in all four of these branches; some excelled in one, and some in another. In the various other branches and departments there seemed to be no correspondence with later accomplishments whatever. Thus it is seen that, while much standardization of medical schools has taken place, much individuality still exists.

Speakers from Albany (including Thomas Ordway, Dean of the Albany Medical College) described the individualistic efforts put forth by them to develop the type of student who will later be satisfied with life in rural communities. This feature is stressed in the choice of the students admitted; in the final year of their course they are sent out for informal instruction with general practitioners of good standing. They are said to retain an interest not only in rural life but in rural medicine. Courses are to be offered at Albany for their graduates aimed to keep them up to date.

This may, in some degree, answer the criticism of Dr. McCormack of Kentucky, who states that "the Class A medical schools are turning out Lincolns and Pierce Arrows, whereas the country as a whole needs more Fords and Chevrolets!" He pointed out that "sixty counties in Kentucky presently have no doctors under fifty years of age." A Texan stated that graduates of Class A medical schools remained in his state only long enough to seek a salaried position. In any case, and in all states, this matter of the farmer—his good roads and better car—have a bearing on the life of the doctor and the type of practice left for him. The farmer has come to know the possibilities of medical science, and the answer must likely be well managed and functioning smaller hospitals in all of our smaller cities.

HOSPITAL CONFERENCES

The problem of keeping our doctors up to date at a time when our concepts are so rapidly changing brings

*Asst. Director, Council on Education, Washington, D. C.

into review the pivotal position of the hospital. Despite the fear of some of our county and state societies that hospital conferences, reviews and staff meetings may detract some interest from them, observing physicians agree that there is at this time no constantly available opportunity for graduate study for the physicians engaged in practice in all lines better than the present day weekly and monthly hospital meetings.

Dr. D. C. Ensign (reading Dr. Sladen's paper) spoke for the work in the Henry Ford hospital at Detroit.

It was interesting to hear such statements as the following—"Our two weekly meetings are made a forum for the sharpening of medical wits—a school in ethics—an opportunity for the older men to mold, criticize and develop the younger." And note this important technical comment: "We find time for discussions of 'the King's English—medical history—general morale—deviations from the normal—a survey of material for research and comments on the proper presentation of material to more formal societies.'"

The hours of meeting must, of course, depend much on local conditions. However, too few hospitals, it seems to me, give sufficient attention to the great advantage of an early morning hour—either 7:00 to 8:00 or 8:00 to 9:00 a. m. One doctor complained bitterly because most of his meetings evidently occurred in connection with an evening, and with the intermingling of anatomical specimens with the dishes he had been quite driven to become a vegetarian!

INTERNS

As usual, the speakers were solicitous, caustic or dismayed at the attitude of many interns. A friendly man suggested that "all teachers expect the intern to become as proficient as they are themselves in their own limited line."

Another thought that instead of having a rotating service it would be better if the intern put all his time in one department, on the basis that if he were more highly trained in one branch it would be better than a casual look at many!

At Harvard they have found it advantageous to teach the third and fourth year men to make yearly examinations upon themselves and the rest of the student body. This work, done under the supervision of the medical department, not only gives them valuable teaching, but excellent information regarding themselves.

Studies made at Cornell, it appears, would indicate that the health of the students retrogresses as they approach their final and fourth year. Whether this came from overstudy, too little exercise, dissipation, or otherwise, was not stated.

Many would agree unqualifiedly with Dr. L. B. Wilson that medical students of today likely are not taught sufficiently, "about useless things"—art, music, history—the basis of useful avocations. Indeed, I am led in contemplating the all-important matter of a proper choice of men for medicine, to quote from Joseph Collins.

"A man to be greatly good must imagine intensely and comprehensively; he must put himself in the place of another, and many others: the pains and pleasures of his species must become his own." We may well ask with the author, "Is the aspirant for a position in our profession such a man; can he develop such a personality; is he able to assist in the creation of a public opinion whose momentum will wipe out self-consciousness, crush out prejudices, destroy self righteousness, and purge us of our besetting sin: a subordination of the universal to the individual?"*

Glenn Frank's recent discussion on "Adult Education" also comes to mind.

The interns of today are the practitioners of tomorrow. Like our children, they copy our actions and deeds; they pay little attention to our words. The problems of our hospitals, like those of life in general, are never solved. We must, with Einstein, sense a universe in which Time interposes a factor, shattering our sense of fixity. No sooner have we adapted ourselves to a régime than the régime itself changes, dissolves, or presents sufficient new angles to call for all degrees of readjustment, even up to those that are revolutionary. We should, therefore, be wise enough and just enough to anticipate something of the situations that are constantly arising. In this manner our adaptation is gradual, and revolutionary changes are not so apt to find us "with the concrete totally set," and with our adaptability quite lacking, and with the stage set for all those glorious "misunderstandings" that render life as complex as it is inscrutable.

It is freely stated that many physicians are unhappy, unsuccessful and dissatisfied because their personality fabric was not such that they could ever slip noiselessly into a useful niche, either in their profession or into any community where they seek to live. Each man must find a place for himself. He must have a chance to support his family. He should be in possession of enough common sense to avoid speculation, to husband his resources, and to live a reasonably calm and dispassionate life. We should not blame either Fate or our calling for our own unsocial traits or cultural inadequacies.

*From Shelley's "Defense of Poetry," quoted in Joseph Collins' book, "The Doctor Looks at Marriage and Medicine."

MINNESOTA DEPARTMENT OF HEALTH, DIVISION OF VITAL STATISTICS

Gerda C. Pierson, Director

1928

DISEASES	DEATHS	RATE (PER 100,000 EST. POP.)
*Heart Disease	4102	150.70
*Cancer	2896	106.40
*External Causes:	1989	73.07
Automobile Accidents	407	14.95
Railroad Accidents	123	4.52
Accidental Drowning	169	6.21
Accidental Poisoning	45	1.65
Other Accidents	853	31.34
Homicides	57	2.09
Suicides	335	12.31
*Pneumonia	1799	66.09
*Nephritis	1464	53.78
Tuberculosis (All Forms).....	1459	53.60
Pulmonary Tuberculosis	1219	44.78
Other Forms Tuberculosis.....	240	8.82
*Influenza	1083	39.79
*Diabetes	512	18.81
Maternal Deaths	261	9.59
Puerperal Sepsis	89	3.27
Other Deaths in Puerperal state.....	172	6.32
*Diarrheal Diseases of Children—(Under 5 years).....	210	7.71
*Syphilis	146	5.36
Whooping Cough	83	3.05
*Alcoholism	78	2.86
Diphtheria	73	2.68
Scarlet Fever	64	2.35
Epidemic Encephalitis	72	2.64
Acute Anterior Poliomyelitis.....	57	2.09
Epidemic Cerebro-spinal Meningitis.....	49	1.80
Measles	13	.48
Typhoid	12	.44
*Gonorrhea	5	.18
Smallpox	0
Total above causes.....	16,406	
Deaths all other causes (exclusive of 1,464 stillbirths).....	9,563	
Grand Total	25,969	
General death rate per 1,000 estimated population.....		9.54
Estimated State population—2,722,000		

The above table is being published for the information of our readers. Any vital statistics contain admittedly some element of error, probably as a result of difference of opinion among members of the profession as to the actual cause of death, as well as to errors in diagnosis. Nevertheless, it is evident from the above that heart disease heads the list by a wide margin and the efforts being directed by such agencies as the Heart Committee of our Association (mentioned in an editorial in this number of the journal) in an effort to cut down the present figure are fully justified. For the first time tuberculosis has fallen to sixth place as a cause of death, it having fallen to fifth place in 1923.

The additional data submitted by the State Board of Health are also of interest:

	Births	Rate	Deaths	Rate
1927	50,940	18.96	24,721	9.2
1928	49,441	18.16	25,969	9.54

*Subject to slight revision.

COMMUNICATIONS

STATE OF MINNESOTA INSURANCE DIVISION
DEPARTMENT OF COMMERCE,
SAINT PAUL

March 30, 1929.

Dr. E. A. Meyerding,
Secretary, State Medical Society,
11 West Summit Avenue,
Saint Paul, Minnesota.
Dear Sir:

Numerous complaints have been received by this Department from citizens of this State who have accepted policies of insurance issued by companies not licensed by this Department. These companies have no licensed agents in the State and operate entirely by the use of the mails, and hence it is impossible for this Department to obtain jurisdiction over such companies.

Among these unlicensed insurers are many which confine their activities to members of your profession, some of them issuing, chiefly, malpractice policies. It is seldom that any information reaches the Department concerning the solicitation of insurance by these companies until a claim arises and then it is too late for the Department to be of any assistance to the insured.

We suggest, when the opportunity arises, that you direct the attention of your members to the practices of these companies and advise your members, when solicited for insurance, that they ascertain whether the company is one duly licensed to write business in this State and advise them that if they place insurance with an unauthorized company this Department can render no assistance to them and, further, that the courts of this State have no jurisdiction to hear or determine their claims because it is impossible to serve upon such insurers, entailing the necessity of the claimant going into the state where the company is licensed, to bring his action.

As previously stated, this letter is occasioned by the numerous complaints which we have received recently, many of them coming from members of your profession, from which it is apparent that these insurers are particularly active in your membership.

Yours very truly,
(signed) C. P. Diepenbrock,
DEPUTY INSURANCE COMMISSIONER.

Minneapolis, Minn., April 2, 1929.

To the Editor:

In the April, 1929, issue of the State Journal, page 238, under the heading "Proceedings of the Minnesota Academy of Medicine," Dr. Franklin R. Wright is

quoted in part as follows: "In another case, at the suggestion of my friend Dr. Farr, I used novocaine as an anesthetic. One grain was given. The patient died of novocaine poisoning. I always used tropicain, except in this one case."

The statements contained in the above quotation exemplify some characteristics which are not uncommon in the literature or spoken word when local anesthesia is the topic of discussion. While the statement that this patient died after being given novocaine, at my suggestion, might be interpreted as a personal criticism, I am certain Dr. Wright had no such intention—especially as I was not present when the remarks were made.

My reasons for referring to Dr. Wright's discussion are that other erroneous conclusions, besides the one mentioned above, might be drawn from his statements, which are somewhat short on qualifications.

I assume that when Dr. Wright refers to "tropicain," he means the drug known as "tropococain." This drug is conceded by all authorities upon the subject to be at least twice as toxic as novocaine, the potency being equal. This, of course, is the reason for the choice of novocaine, by the vast majority of surgeons, for the production of analgesia—whether of the intra-spinal or other types.

The toxicity of novocaine is so dependent upon the manner of its administration and the total amount of the drug used is so relatively unimportant that the statement that a patient died after the administration of a certain amount—unless carefully qualified by a recitation of other factors—has practically no significance. In spinal anesthesia especially, unless precautions are taken to prevent the drug reaching the higher nerve centers—in the brain—death may result from exceedingly small doses. The specific gravity of the injected solution, the position of the patient immediately after its injection, etc., are of the utmost importance.

I wish also to correct another impression which Dr. Wright's statements may have made, to wit: my own experience with spinal anesthesia has been so comparatively limited that I have never, so far as I can recall, presumed to instruct anyone in the manner of its administration, which is, after all, the crux of the subject of the toxicity of spinal anesthesia. I believe, however, that the toxicity of local anesthetics, when their potency is taken into account, is quite nearly parallel whether they are employed intra-spinally or otherwise—if this be true, novocaine would still be more desirable than tropococaine, even for spinal anesthesia—a premise which is borne out by the majority of observers.

Thanking you, I am,

Yours truly,

ROBERT EMMETT FARR, M.D.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL ASSOCIATION SIXTY-FIRST ANNUAL SESSION

PROGRAM

MONDAY, MAY 13, 1929

10:00 A. M.

Meeting of the Council

BLUE ROOM

MASONIC TEMPLE

2:00 P. M.

Meeting of the House of Delegates

BLUE ROOM

MASONIC TEMPLE

Registration and Meeting Headquarters

MASONIC TEMPLE

OFFICERS

J. T. CHRISTISON, <i>President</i>	Saint Paul
A. G. LIELOFF, <i>First Vice President</i>	Mankato
C. O. ESTREM, <i>Second Vice President</i>	Fergus Falls
E. A. MEYERDING, <i>Secretary</i>	Saint Paul
A. G. SCHULZE, <i>Treasurer</i>	Saint Paul

JOINT CHAIRMAN, PROGRAM AND GENERAL ARRANGEMENTS COMMITTEE

J. S. WHITE.....	Saint Paul
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SECTION ON MEDICINE

C. N. McCloud.....	Saint Paul
R. L. NELSON.....	Duluth

SECTION ON SURGERY

WALTMAN WALTERS.....	Rochester
S. H. BAXTER.....	Minneapolis

CLINICAL DEMONSTRATIONS

W. A. O'BRIEN.....	Minneapolis
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SCIENTIFIC EXHIBITS

W. A. O'BRIEN, *Director*
MAYO CLINIC

Diseases of the Heart

F. A. WILLIUS, A. R. BARNES, and H. L. SMITH

Diphyllobothrium Latum

T. B. MAGATH and H. E. ESSEX

Carcinoma of Lung

P. P. VINSON, H. F. MOERSCH, and B. R. KIRKLIN

Congenital Anomalies of the Valves of the Right Auricle

WALLACE YATER

A Case of Heart Block

R. A. WILLIUS and WALLACE YATER

Special X-ray Exhibit

C. SUTHERLAND

Celldin Casts of Heart Cavities and Circulation Paths

M. B. WHITTEN

UNIVERSITY OF MINNESOTA

Fresh Gross Pathology Demonstration

University of Minnesota Medical School, Department
of Pathology.

MINNESOTA DEPARTMENT OF HEALTH

Communicable Diseases

O. McDANIEL

Milk

MR. H. A. WHITTAKER

Veneral Disease

H. G. IRVINE

Maternal and Infant Hygiene

E. C. HARTLEY

MINNESOTA RADIOLOGICAL SOCIETY

Plate Demonstration

GYNECOLOGICAL

Lipiodol Filling of the Uterus and Tubes

W. A. COVENTRY and RUSSELL J. MOE, Duluth

CLINICAL PROGRAM

RAMSEY COUNTY MEDICAL SOCIETY

Monday Morning, May 13

8:30 A. M.

AUDITORIUM, MASONIC TEMPLE

W. H. HENGSTLER, *Presiding Officer*

Coronary Occlusion

E. T. F. RICHARDS.....Saint Paul

Emergency Surgery of the Upper Abdomen

HARRY ZIMMERMANN.....Saint Paul

Cretinism and Other Glandular Insufficiencies

WALTER RAMSEY.....Saint Paul

Pneumonia and its Complications

E. V. GOLTZ.....Saint Paul

Emergency Chest Surgery

H. J. O'BRIEN.....Saint Paul

Plastic Surgery

HARRY RITCHIE.....Saint Paul

Medical Conditions of the Large Bowel and Appendix

CHARLES N. HENSEL.....Saint Paul

Surgical Conditions of the Large Bowel and Appendix

ROBERT EARL.....Saint Paul

Complimentary Luncheon by Ramsey County Medical Society, Ground Floor, Masonic Temple.

Monday Afternoon, May 13

1:30 P. M.

AUDITORIUM, MASONIC TEMPLE

PRESIDING OFFICERS

C. NAUMANN McCloud and WALTMAN WALTERS, *Chair-*
man; STEPHEN H. BAXTER and ROBERT LYMAN

NELSON, *Secretaries*

Physicians and Dentists Service Bureau

D. D. HILGER.....Saint Paul

SYMPOSIUM ON FRACTURES

Fractures of the Bones of the Hands and Fingers

B. S. ADAMS.....Hibbing

Fractures of the Wrist

M. H. TIBBETTS.....Duluth

Fractures About the Elbow Joint

WALLACE COLE.....Saint Paul

Acromio Clavicular Dislocations (*lantern slides*)

MYRON HENRY.....Minneapolis

Fractures and Injuries of the Spine

J. R. KUTH.....Duluth

Tibial Fractures into the Knee Joint

ARTHUR COLLINS.....Duluth

Delayed Union and Its Causes

M. S. HENDERSON.....Rochester

Fractures of the Os Calcis and the Small Bones of the Foot

C. C. CHATTERTON.....Saint Paul

Local Anesthesia in Fractures

CARL O. RICE.....Minneapolis

Fractures about the Hip Joint

J. S. HOLBROOK.....Mankato

Unhappy Results in the Treatment of Fractures (*lantern slides*)

KELLOGG SPEED.....Chicago

Associate Professor of Surgery, Rush Medical College

Round Table Discussion on Fractures

Led by KELLOGG SPEED

Compound Communited Fractures of the Forearm

M. O. OPPEGAARD.....Crookston

Fractures of the Elbow

W. G. WORKMAN.....Tracy

Case Report

L. SOGGE.....Windom

Recurrent Fractures of the Patella

W. A. PIPER.....Mountain Lake

1. Attending physicians are invited to bring abstracts of cases with x-ray films dealing with fractures and injuries for discussion. The requests for the presentation of such cases should be mailed to the Secretary, State Society, three days before the meeting.

2. There will be a demonstration of orthopedic appliances and application of casts.

Monday Evening, May 13

6:00 P. M.

Phi Rho Sigma Annual Alumni Banquet

LOWRY HOTEL

8:00 P. M.

AUDITORIUM, MASONIC TEMPLE

MEDICAL ECONOMICS MEETING

E. A. MEYERDING, *Chairman*

The Medical Reserve

COL. GEORGE A. SKINNER, M. C. U. S. A.....Omaha

Surgeon, Seventh Corps Area

SYMPOSIUM ON COST OF MEDICAL CARE

Rural Aspects

O. E. LOCKEN.....Crookston

President, Minnesota League of Municipalities.

Social and Economic Research

MICHAEL M. DAVIS, Ph.D.....Chicago

Julius Rosenwald Fund

The Doctor's Problem

MORRIS FISHBEIN.....Chicago

Legislation and Economics

HERMAN M. JOHNSON.....Dawson

"Better Halves"—A Sketch

MEMBERS OF THE AUXILIARY

Tuesday Morning, May 14

8:30 A. M.

AUDITORIUM, MASONIC TEMPLE

DIABETES

The Treatment of Diabetes (*lantern slides*)

ELLIOT PROCTOR JOSLIN.....Boston

Professor of Medicine, Harvard University.

Glycosuria in Life Insurance Examinations

HENRY WIREMAN COOK.....Minneapolis

Diabetes in its Relation to Surgery

GEORGE P. MULLER.....Philadelphia

Discussion

HENRY L. ULRICH.....Minneapolis

Summary

ELLIOT PROCTOR JOSLIN.....Boston

Sense of Hearing Survey of the School Children in Fergus Falls

W. L. BURNAP.....Fergus Falls

Scientific Exhibit (*Pathological Demonstration, Department of Pathology, University of Minnesota*)

Early Diagnosis of Heart Disease

*CHAS. LYMAN GREENE.....Saint Paul

JOSEPH F. BORG.....Saint Paul

Cardiac Decompensation and its Treatment (*lantern slides*)

MOSES BARRON.....Minneapolis

DISCUSSION:

S. MARK WHITE.....Minneapolis

F. A. WILLIUS.....Rochester

Tuesday Afternoon, May 14

12:50 P. M.

Cinematography Demonstration of Living Tissue Cells Growing in Vitro (*Canti*)

A. C. STRACHAUER.....Minneapolis

Spinal Anesthesia (*lantern slides*)

DANIEL H. BESSESEN and EDGAR A. RYGH.....Minneapolis

Hernia of the Diaphragm Through the Esophageal Hiatus (*lantern slides*)

WALTER H. UDE.....Minneapolis

Perversion of Diaphragmatic Function (*lantern slides*)

GEORGE P. MULLER.....Philadelphia

Professor of Clinical Surgery, University of Pennsylvania

Intermission

Scientific Exhibit (*Mayo Clinic Demonstration*)

GOITER SYMPOSIUM

Familial Tendency in Goiter (*lantern slides*)

A. E. BOOTH.....Minneapolis

Thyroid as a Cause of Cardiac Disability

DONALD K. BACON.....Saint Paul

Preliminary Hemostasis in Thyroidectomy (*moving picture demonstration*)

MARTIN NORDLAND.....Minneapolis

The Exophthalmos of Graves' Disease (*lantern slides*)

FRANK E. BURCH.....Saint Paul

Surgical Treatment of Diseases of the Thyroid Gland (*lantern slides*)

J. DEJ. PEMBERTON.....Rochester

Treatment of Toxic Thyroid with Rays of Short Wave Length

T. G. CLEMENT.....Duluth

DISCUSSION:

ELLIOT PROCTOR JOSLIN.....Boston

CHARLES H. MAYO.....Rochester

*Deceased.

THE ANNUAL BANQUET

PALM ROOM—SAINT PAUL HOTEL

Tuesday Evening, May 14

6:30 P. M.

Toastmaster, R. C. FARRISH, Sherburn

Introduction of Guests

Address of Welcome

WALLACE H. COLE.....Saint Paul

President, Ramsey County Medical Society

The Women's Auxiliary

MRS. BEN F. DAVIS, President.....Duluth

President-Elect

State Association

C. B. WRIGHT, Past President.....Minneapolis

J. T. CHRISTISON, President.....Saint Paul

President-Elect

Entertainment

Wednesday Morning, May 15

8:30 A. M.

Incidence of Liver Disease in Infancy and Childhood

F. W. SCHLUTZ.....Minneapolis

The Treatment of Amenorrhea Associated with Endocrine Disorders (*lantern slides*)

WILLIAM ENGELBACH.....Saint Louis

The Value of Thoracic and Lumbar Ganglionectomy in the Treatment of Thornaud's Disease, Scleroderma, and Thrombo-Angiitis Obliterans (*moving picture demonstration*)

A. W. ADSON and G. W. BROWN.....Rochester

Undulant Fever (*lantern slides*)

F. J. HIRSCHBOECK.....Duluth

Discussion and Case Report

A. B. STEWART.....Owatonna

Relation of Physical Findings to Lung Pathology

S. H. BOYER.....Duluth

Installation of Officers

Factors to be Considered in Gall Bladder Surgery

OLAF J. HAGEN.....Moorhead

UROLOGY

The Recognition and Treatment of Urinary Lithiasis

ARTHUR L. CHUTE.....Boston

Associate Professor, Genito-Urinary Diseases, Tufts College

Lesions Associated with Urinary Lithiasis

F. E. B. FOLEY.....Saint Paul

Surgical Technic

GILBERT J. THOMAS.....Minneapolis

Factors Favoring Recurrence of Renal Stone (*lantern slides*)

WM. F. BRAASCH.....Rochester

Summary

ARTHUR L. CHUTE.....Boston

Wednesday Afternoon, May 15

1:00 P. M.

Our History

A. S. HAMILTON.....Minneapolis

Head Injuries and Their Treatment (*lantern slides*)

CLARENCE W. HOPKINS.....Chicago

Chief Surgeon, Chicago & Northwestern Railway

DISCUSSION:

W. H. HENGSTLER.....Saint Paul

A. W. IDE.....Saint Paul

AUDITORIUM

The Common Cold (*lantern demonstration and moving pictures*)

HILDING C. ANDERSON.....Duluth

Injection Treatment of Varicose Veins (*lantern slides*)

H. O. MCPHEETERS.....Minneapolis

DISCUSSION:

J. M. HAYES.....Minneapolis

Minnesota Radiological Society (*Plate Reading Clinic*)

Cinematography—Davis' Obstetrical Film

LIBRARY

Dangers and Difficulties in the Use of the Esophagoscope (*lantern slides*)

D. GRETH GARDINER.....Saint Paul

A Consideration of Certain Intestinal Parasites

PHILIP W. BROWN.....Rochester

Common Skin Diseases (*lantern slides*)

E. Z. SHAPIRO.....Duluth

Practical Notes on Syphilis

ARTHUR KAHALA.....Crookston

The Care of Psychiatric Patients in Private Practice

E. J. ENGBERG.....Saint Paul

Obstetrical Experience of the Rural Physician

A. J. HENDERSON.....Kiester

Discussion

J. S. LITZENBERG.....Minneapolis

M. C. BERGHEIM.....Hawley

Treatment of Carcinoma of the Esophagus

HERMAN MOERSCH.....Rochester

Treatment of Acute Otitis Media in Infants and Children

C. W. RUMPF.....Faribault

WOMEN'S AUXILIARY OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Monday Afternoon, May 13

Meeting of the State Executive Board

Saint Paul Institute

Monday Evening

Medical Economics Meeting

Masonic Temple

All attending physicians and their wives are invited

Tuesday, May 14

ANNUAL MEETING

SAINT PAUL ATHLETIC CLUB

Address

President J. T. CHRISTISON

Quacks in Minnesota

MR. F. MANLEY BRIST

Business Meeting

12:30 P. M.

OPEN FORUM LUNCHEON

Talks by E. P. JOSLIN, G. A. SKINNER and C. H. MAYO,

Saint Paul Athletic Club

2:30 P. M.

Tea, Saint Paul Institute.

6:30 P. M.

ANNUAL BANQUET

Palm Room, Saint Paul Hotel. All attending physicians and their wives are invited

AUXILIARY COMMITTEES

President of the Women's Auxiliary of the Ramsey County Medical Society—MRS. A. G. SCHULZE.

Hospitality Committee—MRS. E. R. BRAY, MRS. L. W. BARRY, MRS. W. D. BEADIE, MRS. L. E. DAUGHERTY, MRS. GEORGE EARL, MRS. A. W. IDE and MRS. VICTOR PETERSON.

Registration—MRS. CARL LARSON.

CHICAGO MEDICAL SOCIETY SUMMER CLINICS

The Chicago Medical Society will hold a two weeks clinics at Cook County Hospital, June 17 to 29, inclusive. Members of the hospital staff will give these clinics on the following schedule:

8 to 10 a.m. Medical and surgical clinics in amphitheatres.

10 to 12 a.m. Ward walks.

12 to 1 p.m. Luncheon.

1 to 3 p.m. Medical and surgical clinics in amphitheatres.

3 to 5 p.m. Ward walks.

The amphitheatre work will be devoted to medical and surgical dry clinics and lectures. Two amphitheatres will be used simultaneously, one for medical and one for surgical clinics. Each clinic will be one hour in length, thus giving four medical and four surgical clinics daily. Operative work will be done during the hours devoted to ward walks. The clinical work will be confined largely to general medicine and surgical subjects.

It is planned to hold six meetings to be addressed by speakers other than members of the hospital staff on such subjects as heart disease, tuberculosis, obstetrics, physiotherapy, gastro-intestinal disorders and possibly diabetes.

A registration fee of ten dollars will be charged to cover the cost of preparing for and conducting the clinics.

For further information apply to the Chicago Medical Society, 185 N. Wabash Ave., Summer Clinics Committee.

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

The West Central Minnesota Medical Society met at Morris, Minn., April 10, 1929. Following a dinner served at the Merchants Hotel, Dr. S. J. Thorson read a paper on Acute Empyema. Dr. A. F. Giesen presented a paper on Neurasthenia. Both papers were discussed by members of the society.

On July 15, 1929, the society will have their annual picnic at Glenwood, Minn. Drs. Eberlin, Giesen and Linde were elected members of the arrangements committee.

HERMAN LINDE, M.D.
Secretary.

OF GENERAL INTEREST

Work has been started on a new hospital at Moose Lake, Minn., to be known as the Community hospital.

Dr. F. G. H. Maloney of Rochester, Minn., is now located at Ironwood, Michigan, with offices in the Pharmacy Building.

Dr. Henry N. Klein of Saint Paul sailed early in April for Europe, where he will spend some time in study at Vienna.

Dr. William H. Rumpf, Jr., has disposed of his practice in Minneapolis and is now associated with the St. Cloud Clinic, St. Cloud, Minn.

The Phi Beta Pi national medical fraternity will hold a luncheon at noon Tuesday, May 14, in Saint Paul during the state medical meeting.

Phi Rho Sigma will hold its annual banquet at the Lowry Hotel, Saint Paul, at 6 p. m. Monday, May 13, at the time of the state medical meeting.

Minneapolis was selected as the meeting place for the 1930 convention of the American College of Physicians, the time being set for some time in February.

Dr. and Mrs. Henry E. Michelson of Minneapolis sailed in April from New York for a two months' trip abroad. They plan to visit in London, Paris and Vienna.

Dr. Henry E. Combacker of Osceola, Wisconsin, father of Dr. L. C. Combacker of Fergus Falls, Minnesota, died April 2, following a brief illness of pneumonia.

Dr. J. A. Bloomer, formerly of Rochester, has gone to Maryville, Missouri, to be associated in practice with Dr. J. H. Ryan, a former Fellow in the Mayo Foundation.

Dr. Clifford E. Henry, Minneapolis, as national delegate of the Military Order of Foreign Wars, attended the triennial convention of the order in New York City, April 12 and 13.

The marriage of Miss Agnes L. Kealy of Duluth and Dr. H. W. Huseby of Cloquet was solemnized in Duluth, Monday, April 1. Dr. and Mrs. Huseby are now at home in Cloquet.

Dr. and Mrs. George Geist of Saint Paul sailed in April from New York for Naples, Italy. They will spend some time in Budapest, Vienna, and Switzerland before returning home.

Announcement has been made of the engagement of Miss Ruth Ann Cantillon, daughter of M. E. Cantillon of Los Angeles and Minneapolis, to Dr. Douglas Parry Head, son of Dr. and Mrs. George D. Head, Minneapolis.

At the annual meeting held April 11, 1929, the following were elected officers of the staff of Fairview hospital, Minneapolis: President, Dr. Looe Baker; vice-president, Dr. O. F. Schussler; secretary-treasurer, Dr. A. W. Dahlstrom.

Plans have been completed for the erection of a \$27,000 building at Faribault, Minn., to be known as the Central Clinic. The building will be occupied by Drs. Haessly, Hanson and Traeger. Construction will start immediately, it has been announced.

Dr. W. G. Paradis of the Glen Lake sanatorium staff at Oak Terrace, Minn., has been appointed superintendent and medical director of Sunnyrest sanatorium at Crookston and will assume his new duties May 3. Dr. Paradis succeeds Dr. James K. Anderson, who resigned to take up private practice in Minneapolis.

Announcement has been made of a gift of \$10,000 to the Children's Hospital of Saint Paul by Mrs. Samuel D. Flagg as a permanent memorial to the late Dr. Samuel D. Flagg, one of the first practitioners in Saint Paul, who died about a year ago. The money will be added to the permanent endowment fund of the hospital.

Dr. Ernest S. Mariette, superintendent of Glen Lake sanatorium, Oak Terrace, has returned from Florida, where he has spent the past six months. Dr. Mariette became ill last summer and was granted a year's leave of absence from his duties as head of the sanatorium. His health is much improved and he plans to resume his regular duties July 1.

Dr. Russell M. Wilder of the Mayo Clinic, Rochester, has been appointed professor and chairman of the department of medicine at the University of Chicago. He will succeed, June 1, to the chairmanship vacated by Dr. Franklin C. McLean, who has been made director of university clinics. Dr. Wilder will direct a study of diseases of the pituitary gland, which has been made possible through a gift of \$75,000 to the university by John D. Hertz.

Among the Minnesota physicians who attended the meeting of the American College of Physicians held in Boston, April 8 to 12, were the following: Cyril M. Smith, Duluth; J. Fowler Avery, Clifford E. Henry, A. L. Herman, R. J. McAdory, Robert I. Rizer, Samuel A. Weisman, S. Marx White and Arthur A. Wohlrabe, Minneapolis; Samuel Franklin Adams, Edgar V. Allen, Clifford J. Barborka, J. Arnold Borgen, George E. Brown, Frederick Gaarde, Arthur H. Sanford and Albert M. Snell, Rochester; Everett K. Geer, John A. Lepak and Benjamin B. Souster, Saint Paul.

Dr. A. C. Strachauer has returned from a month's vacation in Florida to resume his private practice at the Nicollet clinic, together with part-time service as director and surgeon-in-chief of the cancer institute at the University of Minnesota.

Dr. Strachauer resigned as head of the department of surgery at the university school of medicine recently to enable him to devote part of his time to his private practice, retaining only his work in the cancer institute.

He will be succeeded as head of the department of surgery by Dr. Owen H. Wangenstein, Dean E. P. Lyon has announced. Dr. Wangenstein will study at Rochester and in Europe the balance of this year and will take over the surgery department January 30, 1930.

Dr. Strachauer has been notified of his election to the board of governors of the American Society for the Control of Cancer. This is a national organization, with headquarters in New York City, and recently reorganized as a foundation with an endowment of one million dollars for research into the problem of malignancy.

OBITUARY

Charles Lyman Greene

Born, Gary, Maine, 1862—Died, St. Paul, Minn., Jan. 18, 1929

Doctor Greene has gone and with his passing goes another one of those stalwart physicians who pioneered in medicine in Minnesota; 1890 to 1929—thirty-eight years of arduous practice. After graduating from the Academic College of the University of Michigan, he came to St. Paul, married Jessie Rice and settled down to work as a clerk in the general offices of the Northern Pacific railroad. With one child added to his family, the blood of his medical father called to him and, undaunted by his responsibilities, he began his medical studies at the University of Minnesota. In his junior year his eyesight temporarily failed, but undeterred and with the help of his wife, who read to him, he continued his studies without interruption and graduated from the University of Minnesota in 1890.

He immediately started his eventful medical career as assistant to that lovable, capable, and wise physician, Perry Millard, for whom Millard Hall, on the University of Minnesota Campus, is named.

As first City Physician under the late Dr. Arthur B. Ancker and attendant at the City Hospital, he began at once to record his medical experiences and observations in various publications.

Not satisfied with his equipment, he later worked with that greatest of all teachers, Sir William Osler, in Baltimore, and when he finished his first book, "Medical Diagnosis," a compendium of accurate knowledge and wise information so helpful to the students whom he taught, he dedicated its pages to that early source of his inspiration.

He further broadened his knowledge and widened his horizon by travel and study abroad in London, Paris, Berlin and Vienna and in the early part of 1894 was given the chair of "The Practice of Medicine," at the University of Minnesota, where he continued to be a source of knowledge and inspiration to many students throughout the state, as his large practice and his frequent consultations amply testify. Later he was made Chief of the Department of Medicine at the University of Minnesota, in which capacity he demonstrated his ability to organize and administer smoothly and efficiently the many problems and conflicts which inevitably arise in any medical school.

In 1914, he began that now historic fight to prevent a liaison between the Medical School and a private institution. Only those who were closely associated with him at that time can realize what that step meant to him—the end of his university teaching—which had meant so much to him for so many years and for which he was so eminently fitted. Nevertheless, be-

lieving that such a union was fundamentally bad for the Medical School which he had served for so many years, he resigned his position, and waged a clean, masterful, losing fight, in which he was supported by a majority of the profession of the state.

He did not confine his teaching to the University class room, but extended it to the wards of the hospitals and even in his private consulting room. Those who were privileged to work as his assistants benefited by his wide knowledge, keen diagnostic acumen and masterful handling of his patients.

Early interested in heart disease, he did much by his writings and teachings to establish a better understanding of cardiac problems, developed a workable plan for rehabilitating these patients, and pioneered in bringing to these patients and their attending physicians also the belief that heart disease was not inevitably fatal, but was responsive to treatment in a majority of instances, and often compatible with many years of usefulness.

As Chief Medical Examiner for the Minnesota Mutual Life Insurance Company, he found a confusion of standards among the various companies as to good and bad risks and methods of examination. He promptly produced a book on "Medical Examination for Life Insurance," which I am told still stands as one of the most satisfactory and complete works on that subject.

Many physicians have profited by his tutelage. Doctor Albert Heath was, I believe, his first assistant, to be followed by the late Doctor Judd Goodrich and he in turn by the late Doctor Peder Hoff, who remained with him for six years and helped in the preparation of his "Medical Diagnosis." His place was taken by Doctor Bristol, now Commissioner of Health of the state of Maine. Then came Drs. E. T. F. Richards and F. A. Olson, the latter now a successful surgeon in Minneapolis. They were followed by the writer of this tribute, who served him from 1914 to 1920, and who still today gladly acknowledges the lift and inspiration he obtained from that association. The late Doctor Ralph Morris served for a time; also Doctor Carl B. Drake and Doctor R. B. Morrissey. After them Doctor Harold E. Richardson, who materially helped in preparing the chapters on Electocardiography in later revisions of his "Medical Diagnosis." And finally, Drs. Warnock and Borg, who stood by him at the last when the wear and tear of his many years of strenuous practice, University teaching and constant study and writing, and repeated revisions of his "Medical Diagnosis," had broken his body though not his spirit.

With that characteristic fortitude and courage which he had exhibited all his life, he battled for two years physical handicap and disability and finally succumbed to that dreadful malady, angina pectoris, which for

many of the last months of his life was an agonizing torment.

So passes a good physician, a wise counsellor, a sound teacher, and a loyal friend.

All hail!

C. N. HENSEL, M.D.

Nelson H. Marshall

1861-1929

Dr. Nelson H. Marshall, a practising physician in Chaska, Minnesota, for 34 years, died suddenly Friday, April 5, of heart failure, at the age of 67 years.

Nelson H. Marshall was born July 24, 1861, at Brownsville, Pa. He was one of seven children of a Methodist minister and his wife. He received his academic training in St. Louis, Mo. His medical training was received at the University of Minnesota. Soon after completing his medical studies in 1892 he was united in marriage with Rachel Taggart, December 20, 1894, at St. Paul, Minn. Shortly after their marriage Dr. and Mrs. Marshall came to Chaska, where he practised until his death, and where in the entire community he was known not only for his fine personal qualities, but also for upholding the fine traditions of the profession to which he belonged. For about 30 years he held the position of public health officer. He was deeply interested in the general welfare of the community.

He is survived by an only daughter, Miss Dorothy Marshall, of Chaska, and three sisters: Mrs. W. A. Magraw and Mrs. J. W. Fogg, of Chicago, and Mrs. J. W. Little of Minneapolis.

John Wyatt

1876-1929

Dr. John Wyatt, 53 years old, a resident of Minneapolis for 45 years, died Tuesday, Feb. 12, 1929. He was born in St. Lawrence county, New York, and was a graduate of Northwestern university medical college. Surviving him are his wife, two daughters, Mrs. L. D. Ordway and Mrs. H. A. Moe of Minneapolis, and two brothers, Simon D. Wyatt of Fond du Lac, Wis., and James C. Wyatt of Chicago.

Otis J. Brown

1856-1929

Dr. O. J. Brown, Morrison county coroner and Little Falls health officer, died March 28, 1929, following a paralytic stroke. He was 73 years old. He practised in Red Wing from 1889 to 1904.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 13, 1929.

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 13, 1929. Dinner was served at 7 o'clock.

The meeting was called to order at 8 o'clock by the President, Dr. C. N. McCloud. There were 35 members present.

Minutes of the February meeting were read and approved.

DR. E. T. F. RICHARDS read the following memorial to Dr. Charles Lyman Greene, and a motion was carried that this be spread on the permanent records of the Academy and a copy sent to the family.

CHARLES LYMAN GREENE was born in Gray, Maine, in 1862. He died in St. Paul on January 19, 1929, at the age of 66 years, from cerebral hemorrhage. His father was a well known surgeon of Massachusetts and Maine and was at one time Professor of Surgery in the University of Michigan.

Receiving his early education in the public schools of Portland, Maine, Dr. Greene was graduated from the University of Michigan in 1885. He then studied medicine at the Universities of Michigan and Minnesota, receiving his M.D. from the University of Minnesota in 1890. This was followed by a year of post-graduate work at Harvard and Johns Hopkins, and in Europe.

Dr. Greene held many important positions on the Medical Faculty of the University of Minnesota: Instructor in Applied Anatomy 1894-1897; Professor of Clinical Medicine and Physical Diagnosis 1897-1903; Professor of the Theory and Practice of Medicine 1903-1909; Professor of Medicine and Chief of the Department 1909-1915. He was also attending physician to several St. Paul hospitals: The City, St. Luke's, the Miller, and the State Hospital for Crippled Children.

Dr. Greene was a member of several medical societies, including the Association of American Physicians, the American Association for the Advancement of Science, American Medical Association, American Therapeutic Association, American College of Physicians, Minnesota State Medical Society, Minnesota Society of Internal Medicine, and the Minnesota Academy of Medicine. He served on different occasions as President of the Minnesota State Medical Society and the Minnesota Society of Internal Medicine. He was at one time medical director of the Minnesota Mutual Life Insurance Company, and President of the National Association of Life Insurance Examiners.

Dr. Greene was a prolific writer and was the author of several well known works, including "Medical Examination for Life Insurance," "Medical Diagnosis," as well as numerous articles on disease of the heart in medical periodicals.

He was a member of the Authors', the Royal Societies' and the American Universities' Clubs in Lon-

don, England; the National Arts, and the Delta Kappa Epsilon Clubs of New York City; the Lafayette Club of Minneapolis, and the Minnesota and University Clubs of St. Paul.

His war record, though hampered by physical disability, was a brilliant one. Appointed Contract Surgeon in September, 1917, he secured a commission as Captain in November, 1917, received his Majority in October, 1918, was commissioned Lt. Colonel in April, 1919, and was made Colonel of the Medical Section, Officers Reserve Corps, in July, 1919.

Possessed of a poise and composure which outwardly nothing disturbed, Dr. Greene was able at all times to bring to the bedside of the sufferer a helpful, reassuring sense of security. His ability to attract and enthuse students and the younger members of the profession made his career as a teacher a notably happy and successful one. His unfailing hospitality, courtesy and charm endeared him to his associates who by his passing have suffered the loss of a loyal friend.

(Signed) JOHN E. HYNES,
G. E. SENKLER,
E. T. F. RICHARDS.

The scientific program of the evening consisted of a paper and case reports as follows:

DR. ARNOLD SCHWYZER (St. Paul) read a paper on "Chronic Mastitis."

DISCUSSION

DR. J. F. CORBETT (Minneapolis): I was greatly interested in Dr. Schwyzer's paper and, as he read it, it occurred to me what I thought was a good definition of malignancy; that malignancy was a riotous atypical proliferation of the epithelial cells; and as I looked at some of these pictures—some of them suggesting carcinoma that were not carcinoma, and others that looked very much like them that were malignant—it occurred to me how easy it is to make a mistake in the histological section.

Bearing in mind the atypical character of the cell, that it is riotous, that it breaks into the surrounding tissue through its membrane, we have something on which to base a diagnosis of malignancy.

In papillomatous growths that were described by Greenough and Hartley, three of these were encountered in a series of twenty malignancies.

On the other hand, I have encountered several cases with such epithelial proliferations, have removed them locally, and followed the cases for years and no malignancy has resulted.

In these, as one studied the cells carefully under the microscope, our first impression of an atypical cell disappears, and we find we are dealing with an orderly arrangement of cells and an orderly cell.

DR. A. R. COLVIN (St. Paul): Dr. Schwyzer has presented a subject which should invite a very great deal of discussion. Somebody has said that tumors of the breast have formed the pathological and histological high school of pathology.

What is adenocystic disease and what are we going to call all the various phases of it? Dr. Schwyzer has indicated the various names applied to it and yet we do

not know what it is; the various names given it are an indication as to the different views held as to its nature; that is, is it primarily neoplastic or primarily inflammatory. The clinical pathological picture is not the picture we see in tumors anywhere else.

Dr. Schwyzer has reminded us of the changes that breast tissue undergoes at different times. It is interesting that the periods at which pathological changes are liable to occur are those in which physiological changes occur; at birth we frequently find inflammatory trouble, even abscess at puberty, and again in lactation; all of these physiological states are accompanied by hyperemia and, as I have said, by acute or sub-acute inflammation. The changes occurring are spoken of as assimilatory and dissimilatory. Changes of a somewhat similar nature occur in the male breast. Clinically these breasts are uniformly enlarged and firm; histologically they present something of the pictures seen in adenocystic disease, in dilatation of ducts and increase in acini, and the presence of a surrounding loose fibrocellular tissue. This condition in the male breast may disappear spontaneously as in one case, the subject being a physician about 35 years of age, one breast and then the other became enlarged and tender and puffy-looking. This condition persisted for some time and then disappeared. The doctor told me that during his wife's previous pregnancies he was always nauseated, but this time the breasts assumed the condition just described. These breasts represent plainly a combination of hypertrophy and inflammation; in other words, about the same picture seen after birth and at puberty and during lactation.

Dr. Schwyzer has shown us the various phases of structural changes found associated with adenocystic disease, most of them not malignant, but in some there was associated malignancy. The great point is, and the point upon which turns the importance of the surgeon's judgment, whether or not such a breast has anything to do with malignancy or whether malignancy is simply an associated condition. Ten to fifty per cent of such breasts are, according to different observers, malignant.

The recognition clinically of adenocystic disease, or cystic mastitis, is usually easy and when one feels in the breast a lot of little shot-like bodies one can arrive at the conclusion that the patient has cystic mastitis.

When a definite lump is felt in a breast in which one has diagnosed cystic mastitis, there may be doubt as to whether or not the lump means carcinoma developing in such a breast. Such breasts should, I think, be explored. At exploration the question of histological examination arises; if it is positive of carcinoma, well and good, but if it is negative from one area it is still uncertain as to whether carcinoma has not begun in another area, because adenocystic disease is a generalized disease of the breast and, indeed, perhaps always both breasts. Such an explored breast should, I think, be removed whether carcinoma is present or not. It can thus be inferred that great judgment is required in the therapeutic approach to such breasts. In young people, I think we are justified in leaving them alone; even a bloody discharge from the nipple in young people need not cause alarm. I can recall one such case in

a young girl, ten years ago, who had been advised to have her breast removed and did not have it done. She is now married, has a child, and has had no trouble.

It is interesting to recall a personal conversation with Dr. Bloodgood, years ago, in which he said that no matter whether excision of an area, removal of the entire breast, or radical operation had been done, in no case had they seen later carcinoma develop; and breast pathology has been a very intensive study at the Hopkins.

It is also interesting to note that the older writers on breast pathology did not stress the occurrence of malignancy in cystic mastitis, and that the greater tendency to cyst formation evidently the less tendency to malignant degeneration.

DR. SCHWYZER (in closing): Dr. Corbett has spoken of the arrangement of the epithelium. The regular arrangement as seen under low power is most important. Unless we have the good fortune of having a competent pathologist at our side—and even then—we ought to understand the pathology of this condition ourselves and study these cases carefully under the microscope. In private practice we do not get an enormous material, but we have a good chance to study the cases individually and follow them up.

I noticed that several men smiled when Dr. Colvin mentioned the swelling of some husband's breasts when his wife was pregnant. The explanation must be looked for in a very reactive sympathetic nervous system. In support of that case I might tell you of a most extreme case I read of in the Swiss Medical Wochenschrift some time ago. The case was reported by a Swiss doctor who had practised in Syria or Palestine. He stated the following personal observation: There was a young couple, both natives of that country, who were very happy. The young wife contracted tuberculosis. Soon after the birth of a child the wife died of her tuberculosis. The man was so wrapped up in that child, and was so frantically afraid that it might not live, that his breasts became lactating and he was able to nurse the child for a considerable length of time. (Relata refero.)

DR. WALLACE COLE (St. Paul) reported two cases of foreign bodies in the joints. Lantern slides were shown.

DR. J. F. HAMMOND (St. Paul) reported a case of ruptured tubal pregnancy, as follows:

The chief interest in this case is the fact that microscopically there was no evidence of pregnancy. The woman was 37 years old and in 1926 she was operated upon for ruptured tubal pregnancy. The tube was removed and she has been quite well since. In December, 1928, she had her last menstrual period and then did not flow until some days after the next period was due, when there was a slight show for one day. On two subsequent occasions she had slight showing for one day. On the morning of February 13 she was taken with sudden severe pain in the lower right quadrant of the abdomen while at the toilet; she collapsed

and had to be helped to bed. She had very severe pain during the day and was admitted to the City Hospital. I saw her about 5 p. m., when she was almost pulseless, abdomen distended, hb. 41 per cent, blood pressure down to 85, pulse rapid 130+, and leukocyte count 21,000.

It was a definite picture of hemorrhage. There was nothing definite to be made out in the pelvis. It was thought the patient probably had a ruptured tubal pregnancy. We opened the abdomen at once and started submammary saline. The abdomen was filled with blood. We delivered the tube on the left side and it was perfectly normal in appearance. The tube on the other side was gone. I went back and inspected the left tube and near the isthmus of the tube there was a small rupture, but no clot about it. There was a cyst of the left ovary but it was a rather innocent-looking affair. There was also a tear in the posterior leaf of the broad ligament. There was no bleeding from any point; the patient probably was so exsanguinated that there was nothing more to bleed. We took out the tube and sutured up the broad ligament. She recovered. We gave her a transfusion as soon as we could manage it—that evening.

Microscopically there was no evidence of pregnancy. And a question arose over the diagnosis. One can't get over the fact that there was a definite rupture of the tube. Dr. Noble reported no evidence of pregnancy in this case.

Dr. A. R. HALL (St. Paul) reported a case of *Brucella Abortus* infection.

In the literature of the past few years there has been an increasing number of reports of cases of infection by *Brucella melitensis abortus*. In these reports the course of the illness has been so variable and the establishing of a diagnosis so long delayed that it seems worth while to report a case of this infection which came under my care.

Mrs. H. M., age 35 years, was confined in the Miller Hospital, by one of my associates on May 9, 1928. The delivery and convalescence were uneventful and quite free from fever.

There was nothing of note in her family history or in her own personal history.

She came to our office on July 30, 1928 (about 2½ months after her discharge from the hospital following her confinement). She stated that after her confinement she had been quite well until about one week before coming to the office, but that during the past week she had felt weak, achey all over, had a poor appetite and had chills (on inquiry these were described as chilly sensations rather than definite chills). Her temperature was 100.2, pulse 92.

On examination nothing abnormal was made out except that her spleen was palpable one finger's breadth below the costal border. The leukocyte count was 6,000 and the Widal reaction negative. She returned to her home at Birchwood, but came back on August 4, 1928, and on that date was admitted to the Miller Hospital. On admission she complained of much the same symptoms as upon her visit to the office on July 30, that is, weakness, loss of appetite, general achey sensation, and

chills. Her temperature was 104.8, pulse 110. She did not look very ill, was quite clear mentally, her tongue was slightly coated but moist. No new findings were made out other than that her spleen was now palpable two fingers' breadth below the costal border. There was a mild secondary anemia and the leukocyte count was 6,100, with 45 per cent polymorphonuclears and 55 per cent lymphocytes. A blood Wassermann was negative and the Widal reaction was negative for typhoid and for paratyphoid A and B. Roentgenograms of her chest showed nothing abnormal. A blood culture taken on August 7, August 9, and again August 15, showed no growth. A search was made for malarial parasites but none were found. Blood taken on August 9, 1928, gave a definite agglutination with *Brucella abortus* in a dilution of 1 in 3,400, and for tularemia in a dilution of 1 in 80 (too low to have any significance).

She continued to have periods lasting 10 minutes to an hour, in which she felt very uncomfortable and chilly and which she still described as chills but in which observation showed there was no actual chill. She ran an irregular fever ranging from 99 to 104, her temperature curve never striking normal. Her pulse ranged from 90 to 120. Her appetite was poor, she vomited on one occasion only. Her bowels were somewhat constipated, the urinary output was good and free from albumin or casts. Several leukocyte counts were done. These showed a definite leukopenia. While at first the leukocyte count was 6,000, it was later 3,750, 4,400 and 4,850. This leukopenia was at the expense of the polymorphonuclear cells rather than the lymphocytes, the polymorphonuclear percentage being 45%, 37%, 43%, 46% and 41%, and the lymphocyte percentage 55%, 63%, 57%, 54% and 58% on different counts. There were never any definite joint pains and nothing resembling a neuritis. For one day there was a skin rash resembling an urticaria, but otherwise the skin was clear. The fever range in Malta fever cases is described as undulating. The fever chart in this case does not show the undulating type.

She remained in the hospital until September 6, 1928, a period of almost five weeks. Towards the end of this period there was a rather rapid subsidence of the fever. From her history she apparently had a continuous fever of about 45 days. She was then free from fever for about one week, when she again had fever for three days. After that there was no further rise of temperature and she was soon back to her former health. When examined on September 28, 1928, she appeared to be in good health. The spleen was no longer palpable. In spite of the high fever she at no time had the appearance of a very ill patient.

The outstanding features of her illness were a long-continued fever, a pulse which was at all times good with a rate never above 120, systemic reactions which she described as chills, an appearance which at no time suggested a very sick patient, an absence of physical findings other than a palpable spleen, a mild secondary anemia, and a leukopenia in which there was a reversal of the usual relative percentage of polymorphonuclear leukocytes and lymphocytes.

After the finding of the agglutination reaction with *Brucella abortus* it was elicited that this woman had

been drinking a goodly quantity of milk. Investigation by the State Board of Health of the dairy herd from which she was receiving her milk, showed that 23 cows gave a positive reaction with *Brucella abortus*, 13 a suspicious reaction, and 25 a negative reaction.

Our difficulty in making a diagnosis was very like the story recorded in many of the case reports given in the literature. We at first thought of typhoid, paratyphoid, malaria, an active endocarditis, tuberculosis, and some hidden infection. A definite diagnosis was not made until the 11th day after she came under our observation.

DISCUSSION

DR. F. L. ADAIR (Minneapolis): The relationship of *Brucella abortus* to the human being is rather interesting. Several years ago Dr. W. P. Larson, at the University, and I took cultures of the amniotic fluid from some dead-born fetuses and also from their stomachs in different stages of gestation in the hope that we might find the *Bacillus abortus*, but we did not find it. If it causes abortion in the human, it does not seem to do so with great frequency. It is rather peculiar that there were not more abortions in the herd of cattle from which this woman got her infection. Among cattle it is a very frequent cause of dead-born fetuses.

DR. F. L. ADAIR (Minneapolis) reported a case of bilateral Krukenberg tumor, as follows:

M. T., private case No. 2214, hospital No. 5345. The patient was first seen in February, 1913, at which time she was 30 years old and had been married six years without ever having been pregnant. Her family history was essentially negative. Menstrual history was established at 17 years of age, had been slightly irregular, coming sometimes three or four days before time, but usually about at four weeks' intervals. The flow was scanty, lasting two days, sometimes passed clots. Has slight leukorrhea about one week before her period. Had some disturbance of urination with frequency and nocturia, also some neuritis of the right leg.

General examination revealed nothing of importance. Bimanual examination showed a rather small uterus with retroflexion-version. The adnexæ showed increased resistance, especially on the left, but no special tenderness and no masses. The case was diagnosed sterility associated with retroversion-flexion; endocervicitis. She was treated with silver nitrate for the endocervicitis and a pessary was used for some months, up until June, 1913.

There was no record of the patient subsequently until she reported to the dispensary of the Minneapolis General Hospital in March, 1928, at which time she complained of some pain in the epigastrium with nausea and vomiting. Physical examination and x-ray of the gallbladder and stomach were made. The gallbladder was reported normal. She had an Ewald test meal which showed the presence of hydrochloric acid. There was no blood in the feces or food. She was admitted to the Minneapolis General Hospital on July 30, 1928, at the age of 45. The complaints were as given above, pain in the epigastrium and nausea and vomiting. This

present attack started on the 28th of July and continued until admission. The patient has had stomach trouble for a long time, associated with attacks of vomiting after meals, not related to any particular type of food. These attacks come on at irregular intervals, several weeks apart. When not having an attack, she had no particular pain or distress. She also complains of some pain in the back, especially on the left. This pain does not radiate from the epigastric region. She can eat almost any kind of food and is not troubled with flatulency.

The physical examination was unimportant except for slight tenderness in the epigastrium on very deep palpation; similar tenderness on deep palpation over the appendiceal region. Liver and spleen were not palpable. On deep palpation, in the hypogastric region, a mass about 10 cm. in diameter can be palpated, lying rather deeply in the pelvis and reaching about 4-5 cm. above the symphysis. This mass was not tender. The stomach was examined and the patient placed on a Sippy diet.

On August 15 an attempt was made to obtain stomach contents but none were obtained. August 25, 70 c.c. of stomach contents obtained and there was an absence of free hydrochloric acid. The patient's temperature was normal with a pulse range from 60 to 95, blood pressure 130/80.

A gynecological examination was made on August 5, at which time the following findings were reported: nulliparous external genitalia, perineum intact; no urethral discharge; both Bartholin glands slightly enlarged, but no redness around orifices. The cervix had a slight bilateral tear and pointed downward and backward. It lay to the left of the midline and felt cystic and was somewhat eroded. The corpus of the uterus seemed somewhat irregular and enlarged, rather firm, and lay to the left of the midline and ante flexed. In the left adnexal region no masses were palpable. In the right adnexal region there was a firm hard mass, which seemed to be about 5-6 cm. in diameter. This mass seemed to be adherent. The diagnosis was a lac erated cystic cervix; chronic Bartholinitis; probable small multiple fibroids; probably chronic bilateral salpingo-oophoritis with inflammatory adnexal tumor on the right.

On August 1, an x-ray examination was made which showed two projections from the lumen of the stomach along the lesser curvature near the antrum. These projections are fairly characteristic of ulcer niche; one of these is fairly large and the base of the niche measures about 3 cm. A smaller niche with a base of about 14 mm. is located distal to the larger one. The appearance is fairly characteristic of multiple gastric ulcers. At six hours, there is about 25 per cent retention meal in the stomach and at 24 hours there is still some barium in the terminal ileum which is probably associated with the slow emptying of the stomach. X-ray impressions: multiple gastric ulcers of a penetrating type and probably benign.

During her stay in the hospital the urine examination was essentially negative. The blood examination showed hemoglobin about 65 per cent, reds 3,290,000;

white count was practically normal. Operation was advised but the patient refused and was discharged September 1, 1928.

The patient again consulted me on February 6, 1929, at which time she stated that she had noticed a firm mass in the left lower quadrant of the abdomen for two months and that she had considerable pain in the lower abdomen for the preceding week. She also had frequency of urination with no dysuria and some nocturia. She passes only a small quantity at a time. She has nausea but no vomiting, no soreness of the breasts. She also has considerable epigastric distress and flatulency. Her appetite has been very poor for the past two weeks. Her last menstrual period was October 10, 1928, and before that had been quite regular.

Physical examination was essentially negative, except for the abdominal and pelvic findings. On bimanual examination there was a rather firm, rounded, movable mass in the left lower quadrant of the abdomen, about the size of a grapefruit. There was also a large mass in the right lower quadrant extending about two fingers' breadth above the navel, firm in consistency. Vascular bruit was heard in the right hypogastric region. On pelvic examination, there was some bloody vaginal discharge. There was some bilateral tear of the cervix with irregular margins. The corpus was hard, mobility restricted, and seemed irregular in form. Bilateral masses could be felt, the larger one being on the right. These masses were not fixed and could be moved more or less independently of the uterus. Operation was advised. About two weeks later the patient was sent to the hospital. These movable masses were more distinct in the lower abdomen; she also had considerable distention of the abdomen with dullness in the flanks and demonstrable fluid waves.

A diagnosis of probable Krukenberg tumors was made and an exploratory laparotomy was advised. This was done on the 23rd day of February, at which time these masses, though somewhat adherent, were removed without great difficulty. Free fluid was evacuated from the peritoneal cavity to the amount of several quarts. This fluid was somewhat blood-stained. On exploration of the abdomen, an elongated mass could be felt toward the pyloric end of the stomach and seemed to be on the greater curvature. This mass had a somewhat irregular and granular feeling on the surface and was quite indurated. No implantations or metastases were demonstrable in the utero-vesicle or recto-vesicle pouches.

The patient has made a fairly good recovery from the operation and is still in the hospital. She now has an enlarged lymphatic node in the supraclavicular region of the right side.

DISCUSSION

DR. D. C. BALFOUR (Rochester): I have never personally seen an implantation of that type from the stomach. It will be very interesting to prove that later on if it can be done.

DR. A. SCHWYZER (St. Paul): This is the largest Krukenberg tumor I have seen. They are as a rule secondary to carcinoma in the upper part of the abdomen.

usually of the stomach. The question is—How does it occur? In the upper abdomen we have a constant motion by the respiration. I saw in one case how it would seem that transplantation happens. It was a carcinoma of the fundus of the gallbladder with Krukenberg tumors in the pelvis. The gallbladder fundus was white and hard and nodular. The carcinoma had come to the very surface. It rubbed against the anterior abdominal wall and one had the impression that the endothelium had become rubbed off through this friction of the respiratory motion. Thus the rubbed-off carcinoma cells would gradually wash down to the bottom of the peritoneal cavity and become implanted on the ovary, where the soil may be particularly adapted. It is interesting that these tumors are most always found on both ovaries. But why should the ovaries be a seat of predilection? We know that, in general, in carcinoma a good many cells become detached and are transported elsewhere. It was Petersen and Colmres of Czerny's Clinic in Heidelberg who studied this question of selective transplantation in cases of carcinoma of the rectum. In rectal carcinoma many single carcinoma cells were found in the capillaries of the lungs. Nevertheless, metastatic carcinoma of the lungs is a very rare occurrence in carcinoma of the rectum and is seen at most in very late cases. Thus it must be that the organism is able to take care of these cells in that particular location as long as it is not overwhelmed by them. They must become destroyed or are made inert. If such carcinoma cells then come upon a certain soil, they do not develop. For certain carcinomata of the upper abdomen the ovary must be a fertile soil and thus becomes a seat of predilection for secondary growth, probably through some biological or chemical cause.

DR. ADAIR: So far as I can find there is no good explanation of the mechanism of the migration of these cells from the stomach to the ovary. It has been thought that perhaps the cells would come to lie on the surface of the ovary and start carcinoma on its surface, but further study indicates that the carcinoma seems to start on the inside of the ovary and not on the surface. If it is simply a falling down of the cells into the peritoneal cavity, one would expect it to start on the surface, but in most of the cases it occurs inside. Just why the cells should be deposited through the circulatory system to this site is difficult to explain. Of course, we do get primary carcinoma of the ovary, but a very large percentage of bilateral tumors are metastatic. There is a question as to whether or not all of these bilateral ovarian tumors are metastatic. Where ascites is also present they are usually metastatic. At autopsy the primary is very often found in the stomach, although sometimes it is found around the gallbladder and other portions of the intestinal tract.

I now have another case of bilateral cystic carcinoma of the ovaries and I do not know whether it is metastatic or not. The primary carcinoma has not been discovered. On the surface of the appendix there is a carcinomatous implantation. This patient may have carcinoma in other places, but it is not apparent clinically.

DR. H. P. RITCHIE (St. Paul) gave a lantern slide talk on Contraction of the Axilla and Contraction of the Wrist, showing method of operating on these cases. The meeting adjourned.

CARL B. DRAKE, M.D.
Secretary.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

HALEY M-O Co.

Magnesia-Mineral Oil (25) Haley

H. K. MULFORD Co.

Perfringens Antitoxin-Mulford

NATIONAL DRUG Co.

Diphtheria Toxin-Antitoxin Mixture

PARKE, DAVIS & Co.

Tetanus-Perfringens Antitoxin, Refined and Concentrated

G. D. SEARLE & Co.

Solution Bismuth Sodium Tartrate-Searle, 1:5 per cent
Sulpharsphenamine-Searle

Sulpharsphenamine-Searle, 0.4 Gm. Ampules

Sulpharsphenamine-Searle, 0.5 Gm. Ampules

Sulpharsphenamine-Searle, 0.6 Gm. Ampules

TRUTH ABOUT MEDICINES

Lipiodine-Ciba (New and Non-official Remedies, 1928, p. 215).—In the form of Lipiodine-Ciba, Diagnostic, it is used as a contrast medium in the localization of bronchial and pulmonary lesions, as a diagnostic aid in gynecology and myelography, for detecting urethral strictures, and in cavities where intensification of the roentgen ray shadows is desired. The dosage for diagnostic work is from 5 to 20 c.c. of Lipiodine-Ciba, Diagnostic, as determined by the extent of the field to be investigated. Ciba Co., Inc., New York.

Lipiodine-Ciba Diagnostic.—A 60 per cent solution of Lipiodine-Ciba (New and Non-official Remedies, 1928, p. 215) in sesame oil. Ciba Co., Inc., New York.

Ampules Lipiodine-Ciba Diagnostic, 5 c.c.—Each ampoule contains 5 c.c. of a 60 per cent solution of Lipiodine-Ciba (New and Non-official Remedies, 1928, p. 215) in sesame oil. Ciba Co., Inc., New York.

Acidophilus Bacillus Liquid-Mulford.—A whey culture of *B. acidophilus* (Moro) in a whey medium, which contains 50 million viable organisms per c.c. at the time of sale. For a discussion of the actions and uses of bacillus acidophilus preparations see Lactic Acid Producing Organisms and Preparations, New and Non-official Remedies, 1928, p. 228. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., March 2, 1929, p. 723.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of Jan. 3, 1929.

The regular monthly meeting of the Minneapolis Surgical Society was held at the Minneapolis General Hospital, Thursday, Jan. 3, 1929. Dr. S. H. Baxter, president, in the chair.

DR. F. A. OLSON presented the following three cases:

Case 1.—Patient is a white male, aged 44, railroad laborer, who was admitted to this hospital September 11, 1928, complaining of a swelling of his abdomen and soreness in his right upper quadrant. For three weeks previous to his admission patient was troubled with a dull ache in the pit of his stomach which always occurred two or three hours after he had eaten. Associated with this, patient had a good deal of belching and obtained relief by taking soda. Shortly after the onset of his trouble patient drank some moonshine which nauseated him and he vomited material containing considerable bright red blood. Previous to this, patient had never vomited any blood. Patient was forced to lay off work because of the swelling of his abdomen.

Past history: The past history reveals the fact that for years the patient had a burning sensation in his stomach, especially after eating, and relieved by soda bicarbonate. The patient has been a heavy alcohol drinker all his life.

Physical examination on admission: Essentially negative except for moist râles in bases of both lungs posteriorly, and for an abdomen that was very distended, with a protruding umbilicus, distended bluish veins over anterior abdominal wall and with dullness to flatness in both flanks. The extremities present considerable edema of both legs and ankles, with brownish macular lesions scattered over both anterior tibial surfaces. Spleen palpable 2 cm. below left costal margin.

Laboratory: Sept. 13, 1927. Urinalysis: essentially negative. Blood study: hemoglobin 58 per cent. RBC 2,800,000. WBC 2,500. PMN 70 per cent. Lymphocytes 28 per cent. Eo. 2 per cent. Wassermann negative. Dec. 12, 1928. Van den Bergh: Direct immediate—negative. Direct delayed—positive. Indirect reaction—positive. Icterus index—15.6. Blood chemistry, Dec. 12, 1928: Creatinin 1 mg. Urea N. 5.7 mg.

Liver function test: 1st specimen: 45 per cent retention $\frac{1}{4}$ hour (Normal 15%); 2nd specimen: 50 per cent retention 1 hour (Normal 15%). Marked loss of liver function.

Ascitic fluid: 6 cells (4 p.m.n. and 2 lymph.) sp. gr. 1.010. Coagulum negative.

X-ray of chest: Both domes of the diaphragm elevated. Hilus areas moderately enlarged. No parenchymal pathology.

Patient requires a paracentesis about every 6 to 10 days, at which time 6,000 to 10,000 c.c. of fluid are removed.

Very little advance has been made in the etiology of cirrhosis and more recently the idea that alcohol is entirely at the base of cirrhosis has been sort of laid aside. The exact cause of ascites is not known. This man has been in for quite a little while and we have had some opportunity to study him. When the ascites increases, so that his abdomen is considerably distended, he gets a marked congestion of both lung bases from pressure together with an edema of both lower extremities. Frequently at the time that he has been tapped they have used a good sized trochar and he has had an infection of the abdominal wall. He has quite a few distended veins but none as large as you often see in cirrhosis. The patient is feeling much more comfortable now. It is remarkable the benefits he gets from tapping. He feels better and stronger in every way and the edema disappears. When it comes to treatment there isn't a great deal to say. Practically every known type of surgical treatment has some cure to its credit. The Talma-Morison is the one operation that has stood the test through all these years and the results of that aren't any too good. At a Clinic down South they do a number of splenectomies in connection with the Talma-Morison. I don't think they are as favorable to it as they were at one time. This patient is being prepared for operation. We have tried in our preparatory treatment to keep the abdominal fluid down to the very minimum. If I was going to operate I would keep the ascites down for several days previously and I believe that I would give this man some calcium with the idea that these patients have a calcium deficiency. Also I believe I would give enough sugar so that he would have a good store of glycogen with the idea of increasing his resistance. We know this factor is very low because ordinarily we do not get infection of the abdominal wall from paracentesis.

Case 2.—This is patient's second admission to the hospital. He is 67 years old and he was here four years ago. He complains of pain over the entire abdomen and back, shortness of breath, cough, and swelling of ankles. Present attack started about December of last year, when the pain became very severe over the entire abdomen. Patient began to cough, ankles became swollen, abdomen became distended and he developed a severe diarrhea which incapacitated him and caused his admission to the hospital. Patient had an injury to the liver about 20 years ago. He dates all his trouble back to that trauma, at which time he was struck by a pitchfork over the upper abdomen. Although there was no external evidence, patient developed a mass over the liver area several months following the accident.

On examination at time of admission there was congestion at both bases, with the heart slightly enlarged and to the left. Blood pressure 140-80. Abdomen did not show any dilatation of the superficial veins. There was a fullness which on percussion proved to be dullness and definite fluid wave could be made out. The liver was thought to be smaller than normal. Spleen

could not be palpated. The ankles were swollen.* No murmur over the heart. Temperature and pulse normal. Respiration normal. Findings were definitely characteristic of cirrhosis of the liver, cardiac decompensation, and possible gallbladder involvement.

Going back into the past history he has both a quantitative and qualitative food disturbance. With these points in view the various laboratory tests were made. X-ray of the gallbladder was taken and a diagnosis of a non-pathologic gallbladder was made. X-ray of the lungs: Lungs and heart were found to be within limits in size, shape and position. Electrocardiogram of the heart was normal. Hemoglobin 65 per cent. RBC 3,600,000. Wassermann negative. Urine negative. Liver function test was made which showed a 60 per cent retention at the end of 10 minutes. Van den Bergh was negative. Blood chemistry: Urea 8; carbon dioxide 50 per cent. His congestion at both bases has cleared up. Edema has cleared up under digitalis and various cardiac drugs. This patient has not been given novasurol. The medical staff feel that this is not a gallbladder disease but a condition of the liver.

The diagnosis was more probable by ruling out the cardiac and gallbladder condition as cause of edema and pain. The abdominal pains are of a vague type and never were localized. He has given a history in the past of having some blood in the stools but that isn't definite. He did have edema of the feet and ankles which has now disappeared under cardiac stimulants. He has slight amount of ascites at present. There is gastric disturbance after fatty foods. He was here four years ago and a diagnosis of cirrhosis of the liver was made at that time.

Clinical diagnosis is not always exact and in certain instances you can not be absolutely sure of an alcoholic cirrhosis after a section of the liver. The diagnosis is fairly well established in the ordinary operation but clinical diagnosis is often difficult. You may see a case that seems to be quite definite and it may prove to be something entirely different. Ascites is more or less of a misleading complication and it is interesting to note that Doctor Cabot reported some 80 cases and his diagnosis was correct in only 30 per cent. In reporting 5,000 cases of ascites he had some 230 cases of cirrhosis and together with that there were a number of tuberculous peritonitis cases, cardio-renal cases, and miscellaneous, so that the diagnosis is not particularly easy.

Case 3.—This patient is 62 years of age now and he has had this tumor for the past six years. During the last six months there has been considerable increase in size. It started with more or less of a small nodule on the lateral surface of the thigh and there has been a gradual increase in size. He came in here on the medical service and has a marked cardio-vascular renal disease. He has recently had all his teeth out, so that surgery of the tumor has been delayed. X-ray shows calcification in the original tumor probably in a small hematomata. We have had an opportunity to observe this for quite a little while. We have considered lipoma. Doc-

tor Wilcox suggests cystic osteofibroma. Doctor Bell saw this case and he suggests lipoma. I believe we will have to definitely decide the issue through a biopsy.

DR. E. A. REGNIER presented the following two cases:

Case 1.—I want to show this man for just a moment. I like to show him, because he is the kind of a case you enjoy seeing around. I operated on him a year and a half ago for practically a complete obstruction of the stomach. He is now perfectly well, weighs more than he ever did and works every day. He has to eat four or five times a day and he doesn't tolerate greasy foods very well. He had had symptoms of obstruction for two weeks. (Above remarks were made before the patient.)

This patient was imported from the Philippine Islands by a wealthy family in Minneapolis when sixteen years of age. He is now forty-one. He is employed as a chauffeur. He was referred to me by a physician with a diagnosis of obstructive lesion of his stomach. The x-rays showed practically a complete obstruction by a malignant lesion. He complained of pain in his epigastrium, nausea and vomiting. For two weeks the pain was almost constant. At operation the stomach showed a lesion in the pre-pyloric region, involving the lesser curvature and a portion of the greater curvature just above the pylorus. The lesser curvature was all puckered on itself so that the stomach looked very small. There was a large crater and the lesion was very hard. I did a partial gastrectomy, removing about two-thirds of his stomach. At first he had to eat six or seven times a day, now he gets along on four or five meals a day. At operation there were some very large nodes down in the pancreas, which were removed. The pathologist first thought they were tuberculous because they had completely broken down, but sections showed cancer. This man is not cured, but has been perfectly well since the operation and able to do his work. I chose to do a partial gastrectomy rather than a gastro-enterostomy, because experience has shown that these patients, even though the hopes of cure are remote, are more comfortable with this type of operation than with the palliative gastro-enterostomy. If there is a recurrence, it will most likely be outside of the stomach, and therefore the patient will not have obstructive symptoms. As to whether or not life will be prolonged for a longer period by a gastrectomy is a matter of conjecture. The eighteen months of perfect health which this patient has enjoyed surely justified the procedure.

Case 2.—I have seen this patient a few times, although I have not made a very close study of his case. In reviewing the literature on the subject of cirrhosis, one is impressed with the infrequency of correct diagnosis. In the case reports of Johns Hopkins University, as reported by Hughson, only 39 per cent of cases so diagnosed could be confirmed by autopsy. His conclusions were that actual diagnosis of cirrhosis could only be made by sections of the liver. As to the question of treatment, there is a diversity of opinion by writers on the subject. They all agree that if surgery is to be done, it should be done early. Unfortunately

very few of these cases are seen by a surgeon in their early stages. Medical men have been reluctant to turn them over for surgery, because the results have not been good. In the Johns Hopkins series the longest time a patient lived following operative procedure was four and one-half years. The Mayo Clinic reports one case living nine and one-half years, after operation. The Talma-Morison operation or some modification of it, is the operation usually employed. Occasionally a splenectomy is also done. A splenectomy will ordinarily divert about one-eighth of the portal circulation. Surgical interference, however, is simply a means of doing away with the ascites; in other words, it is treating a symptom. Under normal circumstances the peritoneum will absorb a tremendous amount of fluid. In a great many cases of cirrhosis, autopsy shows the omentum to be from 2 to 4 mm. thick, especially in the lower abdomen, apparently the result of a chronic peritonitis, so we not only have a peritoneal lining which does not absorb but in turn probably secretes fluid. The Talma-Morison operation, while it may not prolong life, usually, if successful, will certainly add a great deal to the patient's comfort, even though it does nothing to arrest the pathological process. The spleen in this case is definitely enlarged and could be felt after the fluid was removed.

The question of treatment in this case in his present condition is still rather doubtful. I am open to suggestions.

DR. A. E. WILCOX presented a case of repair of esophageal defect. (See Minn. Med. 12:174, March, 1929.)

DR. H. O. MCPHEETERS read a supplementary report on "Injection treatment of varicose veins" (to appear soon in Surgery, Gynecology and Obstetrics).

DISCUSSION

DR. J. M. HAYES: I don't take the credit for initiating this form of treatment in Minneapolis that Dr. McPheeters has kindly attributed to me. Kretschmer, who came from Germany to Red Wing and then to Minneapolis, was the man who started the enthusiasm over this work in this state. About six years ago patients who had been treated by him but were not financially able to pursue the treatment applied for treatment at the out-patient department of the University. We had no experience in this work up to that time but on investigation we found that Linser of Germany had been doing this work since 1911. He had done the work there very extensively and reported it very favorably in 1917.

Up to that time Linser had used only a 1 per cent solution of bichloride of mercury, injecting only 1 c.c. at each sitting. After a study of many thousands of injections he concluded that there were no serious results except through blunders. The only fatal report was that of Hammar (1919). He followed the Linser method but used more than the amount suggested by Linser; in other words, he used a toxic dose.

Sicard of France wrote on the use of a 20 per cent solution of sodium salicylate for this purpose in 1922.

Genevier of France in 1923 wrote on the use of quinine and urea hydrochloride and urethane as a sclerosing solution for the obliteration of varicose veins.

In 1925 Linser suggested a 15 to 25 per cent solution of sodium chloride. He expressed the opinion that this had many advantages over bichloride of mercury. Noble of Vienna in 1926 wrote on the advantages of an invert sugar as a sclerosing solution for varicose veins.

It is interesting to go from one country to the other in Europe and observe the enthusiasm shown by these various men, each determined that his solution is the one of choice for this purpose.

During the past six years, I have done nearly 4,000 injections of bichloride solution and still find that in selected cases it is the solution of choice. When very large veins are present one of the other solutions will frequently give a more rapid obliteration. For the past two years we have used all the above named solutions, and while I think they are all good, I do not find that any one has such distinct advantages over the other as we might be led to believe from the enthusiasm of some of the pioneers.

In six years' use of this method I have had no serious results. Only two patients have had to go to bed following injection, one for six days and one for two days. I have had 8 or 10 sloughs, but they have not been serious and have all healed nicely.

In contrast to McPheeters' method of making a large number of injections at one sitting I believe in being more conservative. I seldom make more than three injections at one sitting.

While there are a few cases of emboli reported in this method of treatment, I believe we are increasing the chances for such results by a large number of injections at one sitting.

I am convinced that this method of treating varicose veins is preferable to surgical removal.

Dr. McPheeters has given us an excellent demonstration of the course of the blood stream, or rather the stagnant condition of the blood in varicose veins, by this injection of lipiodol. Sicard brought this same point out some time ago by injecting sodium iodide into the veins and catching the course of the flow on radiographs.

THEODORE H. SWEETSER, M.D.
Secretary.

SODIUM BICARBONATE AND CALCIUM CARBONATE FOR ALKALIZATION OF URINE

Both sodium bicarbonate and calcium carbonate are effective antacids as far as the gastric secretion is concerned. However, sodium bicarbonate is much more efficient in aiding in the alkalization of the urine than calcium carbonate. The reason for the difference lies in the fact that sodium salts, such as bicarbonate, are freely absorbed by the intestine. On the other hand, calcium carbonate itself is not susceptible of absorption. Sodium bicarbonate may be freely used to the extent of actual alkalization of the urine, though it may take as much as 30 Gm. or more. (Jour. A. M. A., March 9, 1929, p. 831.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

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THOMAS A. PEPPARD,
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CHRONIC APPENDICITIS FROM THE VIEW-POINT OF THE INTERNIST: Harry Wald Bettman, Cincinnati, O., *Annals of Internal Medicine*, Vol. II, No. 6, Dec., 1928). Chronic appendicitis is in no way to be confounded with recurrent appendicitis. Recurrent appendicitis at the time it is observed is in reality an attack of acute or subacute appendicitis. If judged by clinical results, the total number of operations for chronic appendicitis yield disappointing results in 40 per cent of the cases, and investigation reveals the fact that nearly 60 per cent of the patients who have had an unsuccessful appendectomy had received no adequate study before the operation was decided upon.

According to Willis, the mortality in cases of gall stones and appendicitis has mounted continuously from 1900 to 1922. From 1905 to 1921 the death rate from surgical diseases of the kidney diminished 11 per cent; and from pelvic diseases, 26 per cent. The death rate from gastrointestinal ulcers increased 72 per cent; thyroid disease, 250 per cent; and from appendicitis almost 31 per cent. The percentage of deaths from appendicitis per 100,000 population increased in every five-year period from 1901 to 1922. The mortality in 5,664 cases was 1.68 per cent. The increase in mortality is attributed to the fact that the operation is not considered serious and is frequently done by an incompetent surgeon. Further statistics show that in a study of 300 patients unsuccessfully operated upon for chronic appendicitis, 35, or 11.6 per cent, were made definitely worse by the operation.

One of the most serious complications is adhesions of various types, involving the omentum, the ileum and the cecum. One of the common sequelæ of appendectomy is ileac stasis. The author is convinced that ileac stasis is a distinct clinical entity; that it has a fairly characteristic clinical history, and that it can be recognized by appropriate x-ray observation. In ileac sta-

sis barium can be demonstrated in the terminal ileum 12 to 14 hours after administration, and in severe cases even 24 or more hours later.

The author refers to the "furor operandi" of ambitious surgeons as being the main cause of needless appendectomies, and their chief aid and abettor is the roentgenologist. He cites many examples of the differences of opinion as to what constitutes a pathological appendix and what is normal.

The simulation of chronic appendicitis by enterospasm and by intercostal or costolumbar neuralgia is discussed, and particularly the work of J. B. Carnett on "Intercostal Neuralgia as a Cause of Abdominal Pain and Tenderness." The author feels that essential enterospasm, enterospasm from lesions in the distal colon, rectosigmoid and rectum, and finally costolumbar neuralgia are all actual clinical entities.

Finally he makes a plea for a more prolonged and careful study of the individual patient, and deplores the fact that one of the serious shortcomings of our present medical and surgical methods is the quick diagnosis.

RICHARD BARDON, M.D.

LEUKOPLAKIA IN A DIVERTICULUM OF THE BLADDER: Henry G. Bugbee, M.D. (Jour. of Urology, Vol. XXI, No. 3, 1929, 395-399). The author calls attention to the more frequent diagnoses now being made of bladder diverticula. These he believes have been occasioned by an earlier resort to the precise methods of urologic diagnosis. A survey of the literature on diverticulum of the bladder shows but two reported cases in which leukoplakia were found in a diverticulum without involvement of the bladder itself.

The findings are cited in a male patient, forty-four years of age, who presented himself for examination because of pyuria that had been noted during the course of a routine examination for life insurance. Questioning revealed the presence of mild frequency and obstruction of several years' duration. The prostate was not enlarged. There were 6 ounces of residual urine. Cystoscopic examination showed a congested, trabeculated bladder wall. Two centimeters posterior to and to the outer side of the right ureteral meatus there was an opening 1.5 cm. in diameter leading into a diverticulum which had a capacity of 8 ounces. An X-ray catheter was coiled up in this diverticulum and a roentgenogram made.

After three weeks' preparation on an indwelling urethral catheter the diverticulum was resected. The pathological examination of the specimen showed a leukoplakia of the bladder.

Leukoplakia is almost always associated with long continued chronic infection, is slowly progressive, and the only cure is by excision. Its principal importance is that it is apparently a necessary preliminary to squamous cell carcinoma, and the possibility of its occurrence in a diverticulum of the bladder argues for the early resection of a bladder diverticulum.

JOHN R. HAND, M.D.

SURGERY

SUPERVISORS:

DONALD K. BACON,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

WHEN AND WHEN NOT TO OPEN THE ABDOMEN IN ACUTE SURGICAL CONDITIONS: John B. Deaver, M.D. (Annals of Surgery, LXXXIX, No. 3, 340-353). The first step is to decide whether or not a given case of abdominal disease is surgical. This decision represents one of the niceties of surgical judgment. Acute abdominal conditions resemble each other more or less, so that, oftentimes, opening the abdomen is the only means of determining the seat of the disorder. The important thing is to recognize that operation is demanded and to act upon that knowledge, not to watch and wait, but to look and act.

Without doubt the most common ailment in the aforementioned class is acute appendicitis. Its mortality still remains entirely too high. In trying to place responsibility for this unsatisfactory record, it may be said to be divided between faulty diagnosis and either precipitate or procrastinating surgery. Abdominal pain, tenderness, and a certain amount of rigidity of muscles in the lower right abdomen, nausea, vomiting, constipation or, sometimes, diarrhea, should be enough to arouse suspicion of the nature of the disorder. The modern trend is to depend upon the leukocyte count to clinch the diagnosis. To the author the degree of tenderness is much more decisive than the degree of leukocytosis. The time to open the abdomen where the appendix is suspected is before peritonitis has developed. If that moment has been missed, then waiting for localization of the peritonitis, if diffused, is often best. While deaths caused by acute appendicitis are primarily the result of appendiceal disease itself, secondarily they are the result of peritonitis and the toxemia which it causes.

In acute appendicitis, in the presence of peritonitis, the pith of the question is when and when not to open the abdomen to obtain the best results and the minimum mortality. The author believes that, in the absence of a forbidding peritonitis, a patient with acute appendicitis should be operated upon immediately, except in the presence of some grave constitutional condition. He furthermore states that the occasional operator should not be the one chosen to do the work, but the operator of vast and varied experience in dealing with the pathologic abdominal riddles, as he can best deal with any of the many complications that may be present.

In circumscribed appendiceal peritonitis with the abscess close to the ileo-cecal junction, with the terminal ileum having lost to a great degree its contractile power, after the pus is evacuated, the appendix removed and drainage established, an ileocolostomy, or, some-

times, an ileo-cecostomy, will make recovery more certain, in that it prevents obstruction immediately or later.

In the diffusing peritonitis, which is spreading inflammation not involving an extensive area, there is both peritoneal irritation and inflammation. In cases of diffusing or spreading appendiceal peritonitis patients should be operated upon early, which may prevent the spread of peritonitis.

The author presents the picture of diffused appendiceal peritonitis, in which twenty to forty hours after the onset of the peritoneal inflammation the picture changes to one of general abdominal distention, much less pronounced rigidity, tenderness not nearly so decided, absence of peristalsis, and finally a silent abdomen and so forth, presenting a condition which is usually considered hopeless. However, recovery with local abscess formation may occur, the simple evacuation of which is followed by convalescence.

A condition that requires keen diagnostic and surgical judgment is acute intestinal obstruction. An important aid to the diagnosis is the history of a previous operation. In the presence of an abdominal scar, the result of a previous abdominal operation, in a patient suddenly stricken with acute intermittent abdominal pain, one should first think of intestinal obstruction. Its usual characteristics are: sudden onset of intermittent colicky pain, persistent vomiting, normal pulse rate and usually normal, but sometimes subnormal, temperature, contraction of the affected bowel, as evidenced by early stormy peristalsis with visible coils, and later absence of peristalsis. The differentiation between the various forms of obstruction is not of moment. Of most moment, is to get into the abdominal as early as possible and to get out as soon as possible.

In children intussusception should be considered with the signs of obstruction, bloody stools, and the presence of a tumor on rectal or abdominal examination. These cases demand immediate operation.

Of the acute diseases of the lower abdomen, those of the pelvis are the ones that most frequently arouse the question of when to operate and when not to operate. In general, acute puerperal infection had best be treated symptomatically by anatomic and physiologic rest unless drainage is indicated. Acute salpingitis, especially in the unmarried female, and, also, when due to gonorrheal infection, likewise does better under expectant treatment unless complications occur.

The abdomen should be opened at the earliest possible time in cases of ovarian tumor, or a uterine fibroid twisted on its pedicle, or bleeding caused by a ruptured cyst of the ovary, ruptured ectopic pregnancy, placenta previa, accidental hemorrhage in the pregnant woman, ruptured uterus, and perforation of the uterus, accidental or otherwise.

In the upper abdomen the most frequent cause of acute symptoms is an inflammation of the gallbladder.

Such a condition, if ultra acute, whether phlegmonous, perforative, or gangrenous, demands immediate operation as soon as the diagnosis is made. In cases of acute, especially non-calculous inflammation, with very few exceptions, operation should not be considered until the active stage has passed, since the attack will subside under anatomic and physiologic rest.

In subacute perforated peptic ulcer, which is most often duodenal, the abdomen should not be opened immediately, for two reasons: First, this type of lesion is, in most instances, difficult to diagnose; secondly, it is usually taken care of by a protective peritonitis, during the active stage of which operation has more hazards than if made when the peritonitis has subsided and the general peritoneal cavity is well protected. In this latter stage a posterior gastro-enterostomy can be safely made without in any way disturbing the site of the lesion. These are not emergency cases, unless seen immediately after the perforation has taken place, when the diagnosis is not certain.

A common abdominal catastrophe is acute perforated peptic ulcer. The diagnosis is made by the history, if one can be elicited, and, when this is not obtained, by the sudden onset of pain, making its appearance like lightning out of a clear sky, immediately followed by board-like rigidity of the abdominal walls, that are tender. It matters not whether the perforating ulcer is duodenal, gastric or marginal, there is only one road to the goal, and that is the operative route. All patients, barring a very few cases, will get well if operated upon within the first few hours, while they will all die if operated upon too late.

In the presence of a central upper abdominal swelling with overlying rigidity and exquisite tenderness occurring suddenly, particularly in an obese subject past middle life, who, besides being shocked, is more or less livid, with a small, rapid pulse, persisting retching, or vomiting, acute pancreatitis should be considered, and the abdomen should be opened. In this condition an operation cannot be performed too early, but too late.

A condition with a dramatic onset is mesenteric thrombosis—an acute condition of the abdomen, in which, with few exceptions, the diagnosis is not possible without opening the abdomen.

In conclusion, the author refers to a few of the traumatic conditions in which the abdomen should be immediately opened, namely, rupture of the liver, the spleen, the pancreas, the small intestine, and the bladder. The severity of the symptoms and physical signs in these cases depend upon the extent of the injury. When the injury is slight, the evidence of shock, hemorrhage, and muscular rigidity is not so pronounced as in reverse conditions; the sign always present, however, is muscular rigidity caused by intraperitoneal irritation. This alone justifies the immediate opening of the abdomen.

VERNE C. HUNT, M.D.

THE MANAGEMENT OF URETERAL INJURIES WITH A DISCUSSION OF THE SURGICAL INDICATIONS IN PATIENTS WHO REQUIRE URETERAL TRANSPLANTATIONS: Arthur H. Curtis, M.D., F.A.C.S., Chicago, Ill. (Surg., Gynec. and Obst., Vol. XLVIII, No. 3. March, 1929). The author divides surgical injuries of the ureter into two groups: first, those recognized at the time of operation; and, second, those first recognized during convalescence.

If the division occurs during an unusually prolonged or difficult case, in which there is normal renal function on the opposite side, Curtis recommends ureteral ligation without any attempt at transplantation or repair.

In cases, in which the surgical risk does not contraindicate additional operative procedure and also in those difficult cases in which there is deficient renal function on the uninjured side, either ureteral transplantation into the urinary bladder or end-to-end anastomosis of the ends of the severed ureter is advised. Transplantation of the severed ureter is the operation of choice under these circumstances, but when the severed ureter is so short that it cannot be implanted into the bladder without subjecting it to undue tension, end-to-end anastomosis is indicated. The union of the ends of the divided ureter is made over a snugly fitting ureteral catheter which may emerge above from a stab wound in the flank or may extend downwards into the bladder. Curtis emphasizes the necessity of providing drainage of urine above the site of anastomosis and accomplishes it by the introduction of a second ureteral catheter through a slit in the ureter above the site of anastomosis. Both tubes are removed within eight to ten days.

When the injury is recognized during the patient's convalescence the procedure indicated varies in the individual case. Curtis recommends careful observation of the patient over a period as there is a tendency towards spontaneous cure due to the gradual development of ureteral stricture. If this fails to occur, the features of the case will determine the type of surgical interference necessary.

Curtis believes that intestinal transplantation is indicated mainly in those cases in which there are definite pathological changes in the bladder which interfere with its function of storing urine. In unilateral ureteral injury either implantation of the severed ureter into the bladder or end-to-end anastomosis of the ends of the divided ureter is the preferable procedure.

C. M. SPOONER, M.D.

THE TREATMENT OF INTESTINAL OBSTRUCTION: Thomas G. Orr, M.D., and Russell L. Haden, M.D. (Annals of Surgery, LXXXIX, No. 3, 354-358). A discussion of the treatment of acute intestinal obstruction may be divided into five parts:

1. Removal of the mechanical obstruction. 2. Re-

lief of dehydration. 3. Relief of hypochloremia. 4. Relief of starvation. 5. Drainage of the small bowel (enterostomy).

If recognized sufficiently early before alteration in the chemistry of the tissues and fluids, operation for the direct relief of the obstruction or strangulation will undoubtedly result in the cure of a high percentage of cases. Unfortunately, many cases are not diagnosed early and present themselves for treatment with the disease far advanced and much damage already done. In most cases operation may be done, with good judgment, only after the patient had received large quantities of water, salt and glucose to relieve the dehydration, hypochloremia and starvation.

Dehydration soon becomes extreme if the small intestine is obstructed. During the acute illness no less than four to six litres of liquid should be given every twenty-four hours. In extreme cases this should be increased. No harm can be done if water is given as long as thirst exists. Water should always be given as salt solution. In the hypochloremia of intestinal obstruction the administration of sodium chloride is an essential part of the treatment. The blood chlorides may be reduced as low or even lower than half the normal. As the disease develops there is a rise in urea and non-protein nitrogen of the blood and usually a rise in the carbon dioxide combining power. Sodium chloride, given in salt solution, tends to restore the chemical changes of the blood to normal.

To treat hypochloremia properly it is necessary to administer sufficient salt solution to return the blood chlorides to normal; the quantity varies with different patients and should be governed by frequent blood studies.

Before any operation is done every patient seriously ill with intestinal obstruction should be given preliminary treatment with salt solution. By using hypodermoclysis and intravenous injection, 3 to 4 litres of water and 50 to 75 grams of sodium chloride may be given in two to four hours. Salt solution may be given safely in 2 per cent solution under the skin, and 5 per cent in the veins if given slowly. After operation salt solution should be given until the patient is out of danger.

The need of food to furnish energy becomes an important factor after the patient has been ill for several days. It is advisable to begin the intravenous administration of glucose early in the disease and continue until the patient can take food by mouth. It may be given slowly in 10 to 25 per cent solution.

There is some difference of opinion in regard to the value of enterostomy in the treatment of acute intestinal obstruction. Enterostomy low in the small bowel is of undoubted value in properly selected cases. Prompt relief from pain, nausea, and a sense of oppression is often noted by the patient soon after the bowel is drained.

VERNE C. HUNT, M.D.

EYE, EAR, NOSE AND THROAT

SUPERVISORS:

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ARTHUR C. DEAN
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ACUTE ACCESSORY SINUSITIS AND ITS MANAGEMENT: Thomas J. Harris, M.D., New York (*Annals of Otolaryngology and Rhinology*, Dec., 1928, XXXVII, 4, 1094). This is a very comprehensive review of acute paranasal sinus infections and the author discusses the history, anatomy, classification, bacteriology, pathology, symptomatology, diagnosis, prognosis, and treatment of the condition. This abstract will deal only with the treatment.

He divides the treatment into Preventive and Curative. Preventive treatment seeks to remove the causative factors, chief of which are nasal abnormalities which cause obstruction to proper ventilation and drainage. The most common form of obstruction is a high deflection of the nasal septum which presses on the middle turbinal. When this abnormality exists the nose is in a stage of chronic inflammation and is the reservoir of germs ordinarily dormant, but which become active if some exciting cause, such as a disordered intestinal canal, exists and arouses them. Proper nasal surgery is likely to be of great benefit here.

Curative treatment consists of relief of pain and promotion of drainage. The coal tar products are especially indicated here. The application externally of heat or cold, sometimes one, sometimes the other, is good. The Bruning light bath is the most satisfactory method of applying heat. The author advises atropin sulphate gr. 1/100 internally three times a day. A dose of castor oil followed by an enema will stimulate elimination. The lack of drainage is usually due to swollen ostia and middle turbinates. Therefore it is desirable to contract these tissues. Adrenalin and cocaine have long been used but adrenalin is so transitory in its action and its resulting engorgement so detrimental that it is best not used. Cocain applied only in a weak solution and always by the rhinologist will prove beneficial. Recently ephedrin in the form of a spray has proved very efficacious. After shrinking the mucosa the nose should be thoroughly cleaned; a warm saline irrigation may be used followed by suction. The nasal pack containing one of the synthetic silver preparations may be allowed in place from 10 to 15 minutes. This treatment may be repeated once or twice daily. Operation should be resorted to only in the fulminating cases. The author mentions antrypuncture only to say that he does not approve of it as a routine procedure. If necessary he irrigates through the natural openings. He uses hot normal saline for the irrigating solution. He cites Davis' experience with vaccines but has not used them himself.

ARTHUR C. DEAN, M.D., F.A.C.S.

LARYNGEAL STENOSIS, ITS RELATION TO TRACHEOTOMY: Gabriel Tucker, M.D., *Transactions of the American Laryngological Association*, 1926*. Tracheotomy is both a cause and a cure of laryngeal stenosis. The most frequent causes of laryngeal stenosis are high tracheotomy or improperly performed tracheotomy. In acute stenosis, on the other hand, tracheotomy below the second ring puts the larynx at rest and results in a cure in a great majority of cases. In chronic stenosis of the hyperplastic or cicatricial type, tracheotomy is again the best method of treatment, especially in cases wherein the laryngeal aperture is of sufficient size to permit bouginage.

Jackson's enumeration of tracheotomic causes of laryngeal stenosis is as follows:

1. Hasty operation.
2. Attempts at general anesthesia that result in respiratory arrest and stabbing operation.
3. High tracheotomy, even when classically done.
4. Division of the cricoid cartilage.
5. Sewing up the tracheotomy wound.
6. Improper postoperative care.
7. Wearing of a cannula of improper size or shape or material or one with a fenestra.
8. Neglect of ordinary decent cleanliness in the wearing of a cannula.

The cross-section area of the larynx at the level of the vocal cords is about half the area below the level of the first ring. Therefore if a cannula is used which has a cross-section area approximately equal to that of the glottis, the trachea at this point having twice this area, air can pass freely around the cannula and normal breathing and phonation is thus restored in acute cases. Further, with the cannula in the low position the larynx is at rest—an essential factor in recovery from acute conditions. In chronic cases the cannula in this situation does not interfere with peroral bouginage.

In recurrent papillomata of the larynx tracheotomy occasionally serves to prevent recurrences. In ulcerative stenosis, due originally to diphtheria and aggravated by long intubation, proper tracheotomy leads to healing of the ulcers, disappearance of the inflammatory thickening of the subglottic tissues, and usually to a final cure. Great care must be taken not to use a cannula which is so large and fits the trachea so tightly as to prevent the passage of air upward through the larynx, or to cause perichondritis of the tracheal cartilage. A duplicate cannula must be secured so as to facilitate daily change and cleansing. Perichondritis may also occur in the thyroid or cricoid cartilages due to high tracheotomy. Moving the cannula from this position to an incision in the third, fourth and fifth rings, together with external drainage of the abscess if any is present, usually leads to recovery.

A long, vertical midline skin incision, from the thyroid notch to the suprasternal notch, is necessary for a proper tracheotomy. The wound is not sutured, to avoid deep infection in the neck, closure taking place by granulation.

VIRGIL J. SCHWARTZ, M.D.

*This abstract is made from a reprint sent to the author personally. Attempts to find the volume and page number in the *Transactions of the American Laryngological Association* for 1926 have proved unavailing and for this reason this information cannot be given.

ROENTGENOLOGY

SUPERVISORS

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ACUTE MASSIVE COLLAPSE (ATELECTASIS) OF THE LUNG: David R. Bowen (*Am. Jour. Roentgenology*, Vol. XXI, 101-136). In this extensive review of the literature on atelectasis, the fact is repeatedly emphasized that this condition is not chiefly a surgical but a common medical complication, which must always be considered whenever pulmonary pathology is suggested. The causes are divided into two groups: (1) those external to the lung, and (2) those within the lung. The latter group is now considered the dominant factor in the production of atelectasis. Upper-respiratory infections, the use of morphine and atropine, anesthetics, and the position of the postoperative patient are cited as predisposing factors.

In regard to diagnosis, a moderate elevation of temperature, rarely above 102° F., is the most important symptom, while the displacement of the heart toward the affected side is the characteristic and diagnostic physical finding. The roentgen film is usually characteristic, the heart being displaced toward the involved side, the diaphragm being raised abnormally high, and more or less of the lung being apparently consolidated. The condition clinically has a great many points in common with lobar pneumonia, and is often associated with it. When clinicians will "think atelectasis" and look for it in all pulmonary conditions, it likely will be found to be a much more frequent medical than surgical complication.

As a post-operative condition, the onset is usually within 24 to 72 hours following the surgical procedure, and the duration is from a few hours to four weeks. The prognosis is usually favorable.

Surgical prophylaxis consists in the prevention of upper respiratory infections, limitation of morphine and atropine, semi-erect postoperative position, with frequent change of posture as soon as the surgical procedure will permit it. After the onset, procedures should be directed toward removal of the bronchial obstruction by posture or bronchoscope.

Atelectasis should be recognized as an important

medical complication, which should routinely be sought for as regularly as tuberculosis or other pulmonary conditions. The clinician is repeatedly advised to "think atelectasis."

H. HILLSTROM, M.D.

THE ROENTGEN RAY DIAGNOSIS OF INFANTILE SCURVY: Ralph S. Bromer (*Am. Jour. of Roent. & Rad. Ther.*, XIX, Feb., 1928). Bromer reviews the literature of infantile scurvy. He points out that the diagnosis of this condition can be made clinically, but that it can be conclusively established roentgenologically.

The gross pathology may consist of the following: (1) subperiosteal hemorrhages; (2) epiphyseal separations or infractions of the adjacent diaphyseal margin; (3) marked atrophy and thinning of the cortex of long bones with widening of the medullary canal; (4) the presence of a yellow marrow at the ends of long bones. The latter constitutes one of the typical lesions of scurvy.

Microscopic pathology reveals a distortion of the proliferating cartilage cells, with absence of mitosis. The zone of temporary calcification becomes several times broader than normal, and is well calcified. Proximal to this zone is a zone of greatly weakened new bone which corresponds to the yellow marrow zone. The epiphyseal centers show similar changes.

Roentgenologic changes are definite, namely (1) a band of dense calcification just at the extremity of the shaft, corresponding to the broadened zone of temporary calcification; (2) next to this on the side toward the shaft, the area of greatly weakened new bone which is represented by a zone of decreased density consisting of the framework marrow, and also known as "Trümmerfeldzone"; (3) atrophic changes in the cortex with thinning of the cortex and disappearance of the trabeculae, producing a smooth transparent aspect like ground glass; (4) a circular dense edge about the centers of epiphyseal ossification which corresponds to the process present in the zone of temporary calcification; (5) evidences in well-advanced cases of subperiosteal hemorrhages.

The author classifies his series of cases into four stages. The first three stages identify the case as to its severity, while the fourth stage is that of healing.

The differentiation must be made from rickets, osteomyelitis, sarcoma, and congenital syphilis. The author discusses the differential diagnosis in detail.

WALTER H. UDE, M.D.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

SPINAL ANESTHESIA. Charles H. Evans, M.D., Clinical Assistant, New York Post Graduate Medical School and Hospital. 203 pages. Illus. Cloth, \$5.50. New York: Paul B. Hoeber, 1929.

ANGINA PECTORIS. Harlow Brooks, M.D., New York. 164 pages. Price, \$2.50. New York: Harper & Brothers, 1929.

DEVILS, DRUGS AND DOCTORS. Howard W. Haggard, M.D., Associate Professor of Applied Physiology, Yale University. Author of *The Science of Health and Disease*. 405 pages. Illus. New York and London: Harper & Brothers, 1929.

SERUM DIAGNOSIS BY COMPLEMENT FIXATION, WITH SPECIAL REFERENCE TO SYPHILIS, THE PRINCIPLES, TECHNIC AND CLINICAL APPLICATIONS. John A. Kolmer, M.S., M.D., Dr.P.M., D.Sc., LL.D., Professor of Pathology and Bacteriology in the Graduate School of Medicine of the University of Pennsylvania and Member of the Research Institute of Cutaneous Medicine. 583 pages. Illustrated, with 65 engravings. \$7.00. Philadelphia: Lea & Febiger, 1928.

This work is the summary of the author's clinical and laboratory investigations during the past nine years in serum diagnosis by complement fixation in the field of bacterial, protozoal and metazoal diseases of man and the lower animals. The identification of blood and seminal stains and the detection of meat and milk adulterations has been prepared for use by serologists, laboratorians, practising physicians and veterinarians.

In Part I, 104 pages are devoted to an exposition of the fundamental principles of the reaction; in Part II and III, 345 pages are well filled with complete, exact, and detailed descriptions of the author's methods of technic, and the remainder of the book presents the clinical application of this test. The illustrations are well chosen, and the bibliography is complete and up to date.

A. W. DAHLSTROM, M.D.

ACUTE INFECTIOUS DISEASES. Schamberg and Kolmer. 888 pages. Illus. Cloth, \$10.00. Philadelphia: Lea & Febiger, 1928.

The second edition of this work, considerably revised and enlarged, promises to make it the same standard authority on infectious diseases that Osler occupies in medicine. Written by a leading dermatologist, and a renowned pathologist, it speaks with definiteness and conviction.

The chapters on vaccination and smallpox are splendid monographs, and contain complete information on every phase of these subjects. The tables and illustrations are particularly illuminating.

The authors accept as final the hemolytic streptococcus as the cause of scarlet fever. They state that the contagiousness of scarlet fever is limited at the outset (as contrasted with measles), but that the disease may be transmitted even two or three months later, in some cases. The Dick test is admitted to have but limited value. Active immunization receives favorable commendation, but should consist of at least five injections of the toxin, culminating in a dose of 60,000 skin test doses. A final opinion on Larson's detoxified toxin-vaccine is withheld. The use of scarlet fever antitoxin as a prophylactic is of value, but has lost favor due to the serum reactions. Human convalescent serum is suggested for temporary immunization. The use of anti-scarlet-fever serum in the treatment of scarlet fever receives enthusiastic approval, but may, however, interfere with complete immunity being established against a subsequent infection.

Passive immunization against measles by the injection of convalescent serum or adult whole blood is strongly urged for children under two years of age, or those for whom measles might be a serious complication of existing pathology.

Prophylactic injections of antitoxin for persons exposed to diphtheria is recommended, despite the argument against this procedure, because of the resulting protein sensitization. The Schick test is considered unnecessary in children under five years of age, as these are practically always positive. To make certain that immunity has been established by toxin-antitoxin, the Schick test should be conducted three to six months after immunization. The authors recommend the use of toxoid instead of toxin-antitoxin with less warmth than this change actually warrants. For treatments of diphtheria they recommend 5,000 units for mild cases, and 10,000 to 20,000 units for more severe types. Children should be given as much, or more, than adults.

The authors recommend the early administration of freshly prepared vaccine for prophylaxis and treatment of pertussis.

The serum treatment in erysipelas is advised in almost all cases.

To anyone who desires a complete exposition of these subjects, this text should prove invaluable. The type, paper and illustrations should satisfy the most exacting.

THOMAS MYERS, M.D.

UROLOGY. Edward L. Keyes, Professor of Urology, Cornell University. 750 pages. Price \$10.00. New York: D. Appleton & Co., 1928.

It is refreshing to open a textbook which at once presents the subjects that are of practical interest to the medical man. Several chapters are given to examination—both general and instrumental. Due consideration is given to all parts of the genito-urinary system as regards anatomy, physiology and pathology, but it is not

superfluous or overdone; hence, the entire subject of Urology can be presented in one volume. Diagnosis, especially differential, is well presented. Treatment both medical and surgical is presented in a simple manner easily grasped and understood. The plates and illustrations are good.

The style of the text is delightful. In reading the

book one at once feels the presence of the teacher, the instructor and friend, and the reader enjoys the benefit of a lifetime experience of the author as well.

The text does not taste of selfishness or arrogance; rather, due credit is humbly given those other writers who may be skilled in Urology.

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Regular meetings, quarterly.

Annual meeting, May

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Annual meeting, October.

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Regular meetings, quarterly.

Annual meeting, December.

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Regular meetings, first Monday of each month except June, July, August and September.

Annual meeting, first Monday in January.

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Dunlap, E. H. Minneapolis
Dutton, C. E. Minneapolis
Dunn, George R. Minneapolis
Dunsmoor, F. A. Minneapolis
Dworsky, Samuel. Minneapolis
Egilsrud, Kristian. Minneapolis
Ehrenberg, C. J. Minneapolis
Eich, Matthew. Minneapolis
Eitel, George D. Minneapolis
Ellison, David E. Minneapolis
Erb, Fred A. Minneapolis
Erdmann, C. A. Minneapolis
Ericson, John G. Minneapolis
Evans, Edward T. Minneapolis

Everlof, J. L.	Minneapolis	Jones, G. M.	Minneapolis	Noran, A. N.	Minneapolis
Fansler, W. A.	Minneapolis	Jones, H. W.	Minneapolis	Nordin, G. T.	Minneapolis
Farabaugh, Chas. L.	Minneapolis	Jones, W. A.	Minneapolis	Nordland, Martin	Minneapolis
Farr, R. E.	Minneapolis	Jones, William R.	Minneapolis	Noth, H. W.	Minneapolis
Feeney, John M.	Minneapolis	Joseph, Alexander	Minneapolis	Oberg, C. M.	Minneapolis
Fenger, E.	Oak Terrace	Kennedy, C. C.	Minneapolis	O'Donnell, J. E.	Minneapolis
Fink, Walter H.	Minneapolis	Kennedy, Jane F.	Minneapolis	Olson, F. A.	Minneapolis
Fischer, G.	Minneapolis	Kennedy, R. Roy	Minneapolis	Olson, G. M.	Minneapolis
Fjelstad, C. Alford	Minneapolis	Kernkamp, Leila	Minneapolis	Olson, Olaf A.	Minneapolis
Fleming, A. S.	Minneapolis	Kibbe, O. A.	Minneapolis	Olson, R. G.	Minneapolis
Flocken, Chas. F.	Pasadena, Cal.	King, E. A.	Minneapolis	Owre, Oscar	Minneapolis
Fowler, L. H.	Minneapolis	King, Harry T.	Minneapolis	Parks, A. H.	Minneapolis
Fredericks, George M.	Minneapolis	King, W. R. C.	Minneapolis	Patterson, W. E.	Minneapolis
Friedell, A.	Minneapolis	Kinsella, Thos. J.	Oak Terrace	Paulsen, E. L.	Minneapolis
Funk, Victor K.	Oak Terrace	Kistler, A. J.	Minneapolis	Pearce, Naboth Osborne	Minneapolis
Gammel, J. H.	Minneapolis	Kistler, C. M.	Minneapolis	Pederson, Harold	Minneapolis
Garand, J. H.	Dayton	Knight, Ralph T.	Minneapolis	Pederson, R. M.	Minneapolis
Gardner, Edwin L.	Minneapolis	Knight, Ray R.	Minneapolis	Peppard, T. A.	Minneapolis
Geist, Emil S.	Minneapolis	Koch, John Charles	Minneapolis	Perry, Ralph St. J.	Minneapolis
Giere, E. O.	Minneapolis	Koller, H. M.	Minneapolis	Peterson, Oliver H.	Minneapolis
Giere, J. C.	Minneapolis	Koller, L. R.	Minneapolis	Petersen, J. R.	Minneapolis
Giere, Richard W.	Minneapolis	Kremer, Walter J.	Minneapolis	Petersen, Thorvald	Minneapolis
Giesler, Paul W.	Minneapolis	Kriedt, Daniel	Minneapolis	Peterson, Willard C.	Minneapolis
Gingold, Benjamin A.	Minneapolis	Kucera, Frank Jos.	Hopkins	Petit, L. J.	Minneapolis
Goldberg, Isadore M.	Minneapolis	Kucera, Wm. J.	Minneapolis	Petter, Chas K.	Oak Terrace
Gordon, George J.	Minneapolis	Kusske, A. L.	New Ulm	Pettit, C. W.	Minneapolis
Gosin, D. F.	Minneapolis	Lajoie, J. M.	Minneapolis	Phelps, Kenneth A.	Minneapolis
Grave, Floyd	Minneapolis	Lapierre, Arthur P.	Minneapolis	Platou, Erling S.	Minneapolis
Green, E. K.	Minneapolis	Lapierre, C. A.	Minneapolis	Pollard, D. W.	Minneapolis
Greene, Willard P.	Minneapolis	Lapierre, J. T.	Minneapolis	Polzak, Jacob	Minneapolis
Greisheimer, Esther M.	Minneapolis	Larson, Clarence M.	Minneapolis	Poppe, F. H.	Minneapolis
Gunderson, Nels A.	Minneapolis	Laurent, A. A.	Minneapolis	Porter, Oliver M.	Minneapolis
Hacking, Frank	Minneapolis	LaVake, R. T.	Minneapolis	Pratt, Fred J.	Minneapolis
Haddow, N. W.	Minneapolis	Lazar, H. L.	Minneapolis	Pratt, J. A.	Minneapolis
Hagen, C. L.	Minneapolis	Leavitt, H. H.	Minneapolis	Preine, I. A.	Minneapolis
Haggard, George D.	Minneapolis	Lebowski, Jos. A.	Minneapolis	Prim, J. A.	Minneapolis
Hall, J. M.	Minneapolis	Lee, H. M.	Minneapolis	Proshak, Chas. E.	Minneapolis
Hall, S. S.	Minneapolis	Leland, Harold R.	Minneapolis	Quincy, Thomas F.	Minneapolis
Hallberg, C. A.	Minneapolis	Leland, M. N.	Minneapolis	Quist, H. W.	Minneapolis
Hamel, Arnold L.	Minneapolis	Lemstrom, Jarl	Minneapolis	Reed, Chas. A.	Minneapolis
Hamilton, A. S.	Minneapolis	Leonard, L. J.	Minneapolis	Rees, S. P.	Minneapolis
Hamlin, George B.	Minneapolis	Lind, C. J.	Minneapolis	Regnier, E. A.	Minneapolis
Hammond, A. J.	Minneapolis	Lindquist, R. H.	Minneapolis	Reynolds, J. S.	Minneapolis
Hannah, Hewitt B.	Minneapolis	Linner, H. P.	Minneapolis	Rice, Carl O.	Minneapolis
Hansen, Erling	Minneapolis	Linton, Wm. B.	Minneapolis	Richardson, Fred S.	Minneapolis
Hansen, Olga S.	Minneapolis	List, Walter E.	Minneapolis	Richdorf, L. F.	Minneapolis
Hanson, Harlow J.	Minneapolis	Litchfield, John T.	Minneapolis	Ridgway, Florence M.	Minneapolis
Hanson, H. V.	Minneapolis	Litzenberg, J. C.	Minneapolis	Rigler, Leo G.	Minneapolis
Hanson, William A.	Minneapolis	Logeheil, Rudolph C.	Minneapolis	Rishmiller, J. H.	Minneapolis
Hare, Earle R.	Minneapolis	Long, Jesse	Minneapolis	Rizer, R. I.	Minneapolis
Harrington, C. D.	Minneapolis	Loomis, E. A.	Minneapolis	Roan, Carl M.	Minneapolis
Harrington, F. E.	Minneapolis	Lundgren, A. C.	Minneapolis	Robb, Edwin F.	Minneapolis
Hart, William E.	Minneapolis	Lundquist, E. F.	Minneapolis	Roberts, Thos. S.	Minneapolis
Hartzell, Thomas B.	Minneapolis	Lynch, M. J.	Minneapolis	Roberts, W. B.	Minneapolis
Hastings, D. R.	Minneapolis	Lying, John A.	Minneapolis	Robitsek, E. C.	Minneapolis
Hathaway, J. C.	Minneapolis	Lyon, E. P.	Minneapolis	Rochford, W. E.	Minneapolis
Haverfield, Addie R.	Minneapolis	Lynne, Henry	Minneapolis	Rodda, F. C.	Minneapolis
Hayes, J. M.	Minneapolis	MacDonald, A. E.	Minneapolis	Rodgers, Chas. L.	Minneapolis
Head, G. D.	Minneapolis	MacDonald, D. A.	Minneapolis	Rosen, S.	Minneapolis
Hearn, Wm. O.	Minneapolis	MacDonald, Irving C.	Minneapolis	Rosenberg, George C.	Minneapolis
Hedback, A. E.	Minneapolis	McCarthy, Donald	Minneapolis	Rosenberg, Maurice N.	Minneapolis
Helk, H. H.	Minneapolis	McCartney, James S.	Minneapolis	Rosenwald, R. M.	Minneapolis
Hendrickson, J. F.	Minneapolis	McDaniel, Oriana	Minneapolis	Rowe, Paul H.	Minneapolis
Henry, C. E.	Minneapolis	McEachran, A.	Minneapolis	Rucker, Wm.	Minneapolis
Henry, Myron O.	Minneapolis	McFarland, A. H.	Minneapolis	Rudell, Gustav L.	Minneapolis
Herbolzheimer, A. J.	Minneapolis	McGandy, R. F.	Minneapolis	Rumpf, Wm. H., Jr.	Minneapolis
Herbst, Wm. P.	Minneapolis	McGeary, George E.	Minneapolis	Sadler, William P.	Minneapolis
Herman, Arthur L.	Minneapolis	McKinlay, C. A.	Minneapolis	Sawatzky, Wm. A.	Minneapolis
Hiebert, J. P.	Minneapolis	McKinlay, J. C.	Minneapolis	Schaa, F. H.	Minneapolis
Higbee, Paul A.	Minneapolis	McKinney, F. S.	Minneapolis	Schaefer, Wesley G.	Minneapolis
Higgins, J. H.	Minneapolis	McPheeters, H. O.	Minneapolis	Schledrup, N. H.	Minneapolis
Hill, Eleanor J.	Minneapolis	Mach, Frank B.	Minneapolis	Schlutz, Frederic W.	Minneapolis
Hirschfelder, A. D.	Minneapolis	Magiera, Estelle A.	Minneapolis	Schmitt, Aaron F.	Minneapolis
Hirschfeld, F. R.	Minneapolis	Maland, C. O.	Minneapolis	Schmitt, S. C.	Minneapolis
Hoaglund, Arthur W.	Minneapolis	Mann, A. T.	Minneapolis	Schussler, Otto F.	Minneapolis
Hobbs, C. A.	Minneapolis	Marley, W. J.	Minneapolis	Schwartz, Vergil J.	Minneapolis
Hodge, S. V.	Minneapolis	Mariette, Ernest	Oak Terrace	Schwyzzer, Gustav	Minneapolis
Holland, A. S.	Minneapolis	Mark, D. B.	Minneapolis	Schwyzzer, Robert	Minneapolis
Holen, T.	Minneapolis	Martinson, C. J.	Wayzata	Scott, F. H.	Minneapolis
Holl, F. M.	Minneapolis	Matchan, Glenn R.	Minneapolis	Seashore, Gilbert	Minneapolis
Holm, George A.	Minneapolis	Matthews, Justus	Minneapolis	Seham, Max	Minneapolis
Holt, William B.	Minneapolis	Maxeiner, Stanley R.	Minneapolis	Selseth, Iver F.	Minneapolis
Huenekens, E. J.	Minneapolis	May, W. H.	Minneapolis	Shapiro, Morse J.	Minneapolis
Hughes, L. D.	Minneapolis	Mead, Marion A.	Minneapolis	Simons, Jalmar	Minneapolis
Hutchinson, Chas. J.	Minneapolis	Merkert, Charles E.	Minneapolis	Simpson, E. D.	Minneapolis
Hynes, Charles	Minneapolis	Merkert, George L.	Minneapolis	Simpson, John D.	Minneapolis
Hynes, James	Minneapolis	Meyer, E. L.	Minneapolis	Siperstein, D. M.	Minneapolis
Hynes, John E.	Minneapolis	Michael, J. C.	Minneapolis	Sivertsen, Andrew	Minneapolis
Irvine, H. G.	Minneapolis	Michelson, H. E.	Minneapolis	Sivertsen, Ivar	Minneapolis
Irwin, Alex F.	Minneapolis	Moir, Wm. W.	Minneapolis	Slocumb, Maude S.	Minneapolis
Jackson, C. M.	Minneapolis	Monahan, R. H.	Minneapolis	Smith, A. M.	Minneapolis
Jennings, Frank L.	Oak Terrace	Moorehead, Martha B.	Minneapolis	Smith, Arthur E.	Minneapolis
Jennings, Mary H.	Minneapolis	Moren, Edwin	Minneapolis	Smith, Homer R.	Minneapolis
Jensen, Harry	Minneapolis	Moriarity, Cecile R.	Minneapolis	Smith, Norman S.	Minneapolis
Jensen, M. J.	Minneapolis	Morrison, A. W.	Minneapolis	Soderlind, A.	Minneapolis
Johnson, A. E.	Minneapolis	Murphy, Ignatius J.	Minneapolis	Solhaug, S. B.	Minneapolis
Johnson, A. Elov	Minneapolis	Murphy, Leo	Minneapolis	Spratt, C. N.	Minneapolis
Johnson, James A.	Minneapolis	Myers, J. A.	Minneapolis	Stelter, Lloyd A.	Minneapolis
Johnson, Julius	Minneapolis	Nathanson, M. H.	Minneapolis	Stewart, C. A.	Minneapolis
Johnson, Nimrod A.	Minneapolis	Nelson, C. P.	Minneapolis	Stomel, J.	Minneapolis
Johnson, Norman	Minneapolis	Nelson, H. S.	Minneapolis	Strachauer, A. C.	Minneapolis
Johnson, R. A.	Minneapolis	Nelson, O. E.	Minneapolis	Strout, Eugene S.	Minneapolis
Johnson, Selmer M.	Minneapolis	Newhart, Horace	Minneapolis	Strout, G. Elmer	Minneapolis

Sturte, J. R. Minneapolis
 Sundt, Mathias Minneapolis
 Swanson, Roy E. Minneapolis
 Sweetser, H. B., Sr. Minneapolis
 Sweetser, H. B., Jr. Minneapolis
 Sweetser, Theodore Minneapolis
 Sweitzer, S. E. Minneapolis
 Swendsen, Carl G. Minneapolis
 Taft, John O. Minneapolis
 Tanner, Alvin C. Minneapolis
 Taylor, Joseph H. Minneapolis
 Taylor, Rood Minneapolis
 Ternstrom, O. H. Minneapolis
 Thomas, George E. Minneapolis
 Thomas, George H. Minneapolis
 Thomas, Gilbert Minneapolis
 Thompson, H. H. Minneapolis
 Tingdale, A. C. Minneapolis
 Tunstead, Hugh J. Minneapolis
 Turnaciff, D. D. Minneapolis
 Tyrell, C. C. Minneapolis

Ude, Walter H. Minneapolis
 Ulrich, Henry L. Minneapolis
 Undine, Clyde A. Minneapolis
 Urner, John A. Minneapolis
 Voyer, E. O. Minneapolis
 Wahlquist, Harold F. Minneapolis
 Waldron, Carl W. Minneapolis
 Wanous, E. Z. Minneapolis
 Ward, A. W. Minneapolis
 Ward, Percy Minneapolis
 Warham, T. T. Minneapolis
 Watson, J. A. Minneapolis
 Webb, R. C. Minneapolis
 Weisman, S. A. Minneapolis
 Welles, H. J. Minneapolis
 Wethall, A. G. Minneapolis
 Wetherby, Macnider Minneapolis
 Weum, T. W. Minneapolis
 White, S. Marx Minneapolis
 White, Willard D. Minneapolis
 Whetstone, Mary S. Minneapolis

Widen, W. F. Minneapolis
 Wiese, H. F. B. Minneapolis
 Wilcox, Archa E. Minneapolis
 Wilder, Robert L. Minneapolis
 Wilken, Paul A. Minneapolis
 Willcutt, Clarence Minneapolis
 Williams, H. L. Minneapolis
 Williams, Robert Minneapolis
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrabe, A. F. Minneapolis
 Wood, Douglas F. Minneapolis
 Woodworth, Elizabeth Minneapolis
 Wright, C. B. Minneapolis
 Wright, C. D. Minneapolis
 Wright, Franklin R. Minneapolis
 Wynne, H. M. N. Minneapolis
 Ylvisaker, R. S. Minneapolis
 Yoerg, Otto W. Minneapolis
 Zaworski, Ed. A. Minneapolis
 Zierold, A. A. Minneapolis

HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, not stated.

Annual meeting, October.

President
 Williams, R. V. Rushford
 Secretary
 Helland, J. W. Spring Grove
 Anderson, Norman E. Harmony
 Baldwin, A. E. Houston

Belote, G. B. Caledonia
 Browning, W. E. Caledonia
 Christianson, H. W. Wykoff
 Davis, I. G. Rushford
 Drake, E. A. Lanesboro
 Eby, C. B. Spring Valley
 Grinnell, W. B. Preston
 Helland, G. M. Spring Grove
 Helland, J. W. Spring Grove

Lannin, J. C. Mabel
 Lommen, A. P. Lanesboro
 Nass, H. A. Mabel
 Osgard, C. K. Halstad
 Osgard, L. N. Houston
 Palmer, R. C. Lanesboro
 Tierney, C. M. Harmony
 Williams, R. V. Rushford
 Woodruff, C. W. Chatfield

KANDIYOH-SWIFT COUNTY MEDICAL SOCIETY

Regular meeting, at call of President.

Annual meeting, December.

President
 Dowswell, W. J. Kerkhoven
 Secretary
 Scofield, C. L. Benson
 Anderson, R. E. Willmar
 Behmler, Fred W. Appleton

Branton, A. F. Willmar
 Branton, B. J. Willmar
 Daignault, Oscar Benson
 Dowswell, W. J. Kerkhoven
 Frederickson, Alice Lake Lillian
 Frederickson, Guy U. Y. Lake Lillian
 French, H. S. Duluth
 Fiksdal, M. J. Willmar
 Frost, E. H. Willmar

Giere, S. W. Benson
 Hodapp, R. J. Willmar
 Jacobs, John C. Willmar
 Johnson, Hans Kerkhoven
 Kaufman, Wm. C. Appleton
 Rains, J. M. Willmar
 Scofield, C. L. Benson
 Thompson, Arthur Raymond

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, monthly.

Annual meeting, first Tuesday in October.

President
 Akester, Ward Marshall
 Secretary
 Workman, H. M. Tracy
 Akester, Ward Marshall
 Bossingham, O. N. Lake Benton

Bursheim, P. J. Lake Benton
 Ford, Burton C. Marshall
 Germs, Chas. Balaton
 Gray, F. D. Marshall
 Hermanson, Peter E. Ivanhoe
 Hoidale, A. D. Tracy
 Jacquot, G. L. Marshall
 Persons, C. E. Marshall

Robertson, J. B. Cottonwood
 Sanderson, E. T. Minnetonka
 Thordarson, Theo. Minnetonka
 Vadheim, A. L. Tyler
 Valentine, W. H. Tracy
 Workman, H. M. Tracy
 Workman, W. G. Tracy
 Yaeger, W. W. Ivanhoe

MCLEOD COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, September.

President
 Trutna, Thos. J. Silver Lake
 Secretary
 Jensen, A. H. Hutchinson
 Clement, J. B. Lester Prairie

Crow, E. R. Arlington
 Holm, H. H. Glencoe
 Jensen, A. H. Hutchinson
 Klima, W. W. Stewart
 Langhoff, A. H. Glencoe
 Rempel, Dietrich D. Brownston

Sahr, W. G. Hutchinson
 Schmidt, W. R. Glencoe
 Scholpp, O. W. Hutchinson
 Sheppard, Fred Hutchinson
 Sheppard, P. E. Hutchinson
 Trutna, Thos. J. Silver Lake

MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, May, August and October.

Annual meeting, December.

President
 Brigham, Frank Watkins
 Secretary
 Danielson, K. A. Litchfield

Brigham, Frank Watkins
 Danielson, K. A. Litchfield
 Dulude, S. S. Dassel
 O'Connor, D. C. Eden Valley

Peterson, Alfred Dassel
 Robertson, A. W. Litchfield
 Robertson, W. P. Litchfield
 Wilmot, H. E. Litchfield

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of each month except July and August.
Annual meeting, last Thursday in November.

President		Secretary	
Robertson, P. A.	Austin	Fisch, Herbert M.	Austin
President		Secretary	
Allen, A. W.	Austin	Allen, Chas. C.	Austin
Allen, Chas. C.	Austin	Coleman, F. B.	Austin
Cronwell, B. J.	Austin	Fisch, Herbert M.	Austin
Fisch, Herbert M.	Austin	Grise, W. B.	Austin
Grise, W. B.	Austin	Havens, J. G. W.	Austin
Havens, J. G. W.	Austin	Hegge, O. H.	Austin
Hegge, O. H.	Austin	Henslin, A. E.	Austin
Henslin, A. E.	Austin	Herral, G. E.	Austin
Herral, G. E.	Austin	Leck, Clifford C.	Austin
Leck, Clifford C.	Austin	Lewis, Charles F.	Austin
Lewis, Charles F.	Austin	Lommen, P. A.	Austin
Lommen, P. A.	Austin	McKenna, J. K.	Austin
McKenna, J. K.	Austin	Melzer, G. R.	Lyle
Melzer, G. R.	Lyle	Mitchell, R. S.	Grand Meadow
Mitchell, R. S.	Grand Meadow	Morrow, James J.	Austin
Morrow, James J.	Austin	Morse, M. P.	Le Roy
Morse, M. P.	Le Roy	Robertson, P. A.	Austin
Robertson, P. A.	Austin	Sheedy, Chester L.	Austin
Sheedy, Chester L.	Austin	Torkelson, P. T.	Lyle

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, June, September and December.
Annual meeting, December.

President		Secretary	
Peterson, Magnus C.	St. Peter	Daniels, J. W.	St. Peter
President		Secretary	
Daniels, J. W.	St. Peter	Aitkens, H. B.	Le Sueur Center
Aitkens, H. B.	Le Sueur Center	Covell, W. W.	St. Peter
Daniels, J. W.	St. Peter	Dodge, F. A.	Le Sueur
Dodge, F. A.	Le Sueur	Ericson, Swan	Le Sueur
Ericson, Swan	Le Sueur	Goforth, Clifford	St. Peter
Goforth, Clifford	St. Peter	Freeman, George H.	St. Peter
Freeman, George H.	St. Peter	Holtan, Theodore	Waterville
Holtan, Theodore	Waterville	Kirschbaumer, Louisa	St. Peter
Kirschbaumer, Louisa	St. Peter	LeClerc, J. E.	Le Sueur
LeClerc, J. E.	Le Sueur	Lenander, Melvin E.	St. Peter
Lenander, Melvin E.	St. Peter	McKechnie, Wilfred	St. Peter
McKechnie, Wilfred	St. Peter	McKeon, J. O.	Montgomery
McKeon, J. O.	Montgomery	Meilicke, W. A.	Nicollet
Meilicke, W. A.	Nicollet	Peterson, Magnus C.	St. Peter
Peterson, Magnus C.	St. Peter	Strathern, Fred P.	St. Peter
Strathern, Fred P.	St. Peter		

OLMSTED COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday in April, June, September and December.
Annual Meeting, November 21.

President		Secretary	
Dolder, F. C.	Eyota	Piper, M. C.	Rochester
President		Secretary	
Abbott, Walter Dayton	Rochester	Adams, S. Franklin	Rochester
Adams, S. Franklin	Rochester	Adson, A. W.	Rochester
Adson, A. W.	Rochester	Allan, Frank Nathaniel	Rochester
Allan, Frank Nathaniel	Rochester	Allen, Edgar Vanice	Rochester
Allen, Edgar Vanice	Rochester	Allen, Roy William	Rochester
Allen, Roy William	Rochester	Allen, W. A.	Rochester
Allen, W. A.	Rochester	Alvarez, Walter C.	Rochester
Alvarez, Walter C.	Rochester	Amberg, Samuel	Rochester
Amberg, Samuel	Rochester	Anderson, C. M.	Rochester
Anderson, C. M.	Rochester	Anderson, E. W.	Rochester
Anderson, E. W.	Rochester	Anderson, Mark J.	Rochester
Anderson, Mark J.	Rochester	Anderson, Reuben Mauritz	Rochester
Anderson, Reuben Mauritz	Rochester	Anderson, Richard Speight	Rochester
Anderson, Richard Speight	Rochester	Bain, Charles Grant	Rochester
Bain, Charles Grant	Rochester	Balfour, D. C.	Rochester
Balfour, D. C.	Rochester	Bannick, Edwin George	Rochester
Bannick, Edwin George	Rochester	Barborka, C. J.	Rochester
Barborka, C. J.	Rochester	Bargen, I. Arnold	Rochester
Bargen, I. Arnold	Rochester	Barker, Nelson Waite	Rochester
Barker, Nelson Waite	Rochester	Barnes, A. R.	Rochester
Barnes, A. R.	Rochester	Bayard, Harry Frederick	Rochester
Bayard, Harry Frederick	Rochester	Beaver, Meredith Grable	Rochester
Beaver, Meredith Grable	Rochester	Benedict, W. L.	Rochester
Benedict, W. L.	Rochester	Berkman, D. M.	Rochester
Berkman, D. M.	Rochester	Berkman, John Mayo	Rochester
Berkman, John Mayo	Rochester	Binger, Melvin W.	Rochester
Binger, Melvin W.	Rochester	Birkeland, Ivar W.	Rochester
Birkeland, Ivar W.	Rochester	Bliss, Theodore Liston	Rochester
Bliss, Theodore Liston	Rochester	Bodine, Marc Williams	Rochester
Bodine, Marc Williams	Rochester	Boeck, William Charles	Rochester
Boeck, William Charles	Rochester	Bonesteel, Henry T. S.	Rochester
Bonesteel, Henry T. S.	Rochester	Bonta, M. B.	Rochester
Bonta, M. B.	Rochester	Boothby, W. M.	Rochester
Boothby, W. M.	Rochester	Bowing, H. H.	Rochester
Bowing, H. H.	Rochester	Bowles, John H.	Rochester
Bowles, John H.	Rochester	Brasch, William F.	Rochester
Brasch, William F.	Rochester	Bratrude, E. J.	Rochester
Bratrude, E. J.	Rochester	Broders, A. C.	Rochester
Broders, A. C.	Rochester	Brown, A. E.	Rochester
Brown, A. E.	Rochester	Brown, C. B.	Rochester
Brown, C. B.	Rochester	Brown, G. E.	Rochester
Brown, G. E.	Rochester	Brown, P. W.	Rochester
Brown, P. W.	Rochester	Bruner, Julian M.	Rochester
Bruner, Julian M.	Rochester	Brunsting, Louis A.	Rochester
Brunsting, Louis A.	Rochester	Bute, L. A.	Rochester
Bute, L. A.	Rochester	Bumpus, H. C.	Rochester
Bumpus, H. C.	Rochester	Bumpus, Laurin Dudley	Rochester
Bumpus, Laurin Dudley	Rochester	Bunten, William A.	Rochester
Bunten, William A.	Rochester	Busby, James Leslie	Rochester
Busby, James Leslie	Rochester	Camp, John Dexter	Rochester
Camp, John Dexter	Rochester	Carmichael, Hugh Thompson	Rochester
Carmichael, Hugh Thompson	Rochester	Cave, Harry Allan	Rochester
Cave, Harry Allan	Rochester	Caylor, Harold D.	Rochester
Caylor, Harold D.	Rochester	Christensen, Eli E.	Rochester
Christensen, Eli E.	Rochester	Chumley, Charles L.	Rochester
Chumley, Charles L.	Rochester	Clawson, Thomas Alfred, Jr.	Rochester
Clawson, Thomas Alfred, Jr.	Rochester	Coakley, Leo P.	Rochester
Coakley, Leo P.	Rochester	Coleman, Julian Harwood	Rochester
Coleman, Julian Harwood	Rochester	Comfort, Mandred Whitset	Rochester
Comfort, Mandred Whitset	Rochester	Conner, H. M.	Rochester
Conner, H. M.	Rochester	Cooke, Harry Hamilton	Rochester
Cooke, Harry Hamilton	Rochester	Corbelle, Catharine	Rochester
Corbelle, Catharine	Rochester	Counsellor, Virgil S.	Rochester
Counsellor, Virgil S.	Rochester	Craig, Winchell McK.	Rochester
Craig, Winchell McK.	Rochester	Crenshaw, J. L.	Rochester
Crenshaw, J. L.	Rochester	Crewe, J. E.	Rochester
Crewe, J. E.	Rochester	Daniels, Harry A.	Rochester
Daniels, Harry A.	Rochester	Davis, Austin Clifford	Rochester
Davis, Austin Clifford	Rochester	Davis, John Dwight	Rochester
Davis, John Dwight	Rochester	Dawley, Walter Averill	Rochester
Dawley, Walter Averill	Rochester	Dean, Benjamin F.	Rochester
Dean, Benjamin F.	Rochester	DeCarle, Donald W.	Rochester
DeCarle, Donald W.	Rochester	Decker, Walter Joseph	Rochester
Decker, Walter Joseph	Rochester	Desjardins, Arthur U.	Rochester
Desjardins, Arthur U.	Rochester	Ditmore, David C.	Rochester
Ditmore, David C.	Rochester	Dixon, Claude F.	Rochester
Dixon, Claude F.	Rochester	Dixon, Robert Kenneth	Rochester
Dixon, Robert Kenneth	Rochester	Dolder, F. C.	Eyota
Dolder, F. C.	Eyota	Down, Howard Ivan	Rochester
Down, Howard Ivan	Rochester	Doyle, J. B.	Rochester
Doyle, J. B.	Rochester	Drips, J. B.	Rochester
Drips, J. B.	Rochester	Dunlap, H. F.	Rochester
Dunlap, H. F.	Rochester	Eubanks, G. F., Jr.	Rochester
Eubanks, G. F., Jr.	Rochester	Eusterman, G. B.	Rochester
Eusterman, G. B.	Rochester	Evarts, Arrah B.	Rochester
Evarts, Arrah B.	Rochester	Fallon, John Michael	Rochester
Fallon, John Michael	Rochester	Faust, Louis Sanders	Rochester
Faust, Louis Sanders	Rochester	Fauster, John Ulrich, Jr.	Rochester
Fauster, John Ulrich, Jr.	Rochester	Fawcett, C. E.	Stewartville
Fawcett, C. E.	Stewartville	Fehland, Harold Roland	Rochester
Fehland, Harold Roland	Rochester	Figi, F. A.	Rochester
Figi, F. A.	Rochester	Finney, W. P., Jr.	Rochester
Finney, W. P., Jr.	Rochester	Ford, Frances A.	Rochester
Ford, Frances A.	Rochester	Fortin, Harry J.	Rochester
Fortin, Harry J.	Rochester	Foster, Wilmot C.	Rochester
Foster, Wilmot C.	Rochester	Fowler, Louis McCargo	Rochester
Fowler, Louis McCargo	Rochester	Fox, Ben	Rochester
Fox, Ben	Rochester	Frederickson, Clyde Harold	Rochester
Frederickson, Clyde Harold	Rochester	Fricke, Robert Elmer	Rochester
Fricke, Robert Elmer	Rochester	Fulcher, Oscar Hugh	Rochester
Fulcher, Oscar Hugh	Rochester	Gaarde, F. W.	Rochester
Gaarde, F. W.	Rochester	Giffin, H. Z.	Rochester
Giffin, H. Z.	Rochester	Gleason, Notary Arthur	Rochester
Gleason, Notary Arthur	Rochester	Goeckerman, W. H.	Rochester
Goeckerman, W. H.	Rochester	Good, Louis P.	Rochester
Good, Louis P.	Rochester	Good, Ralph W.	Rochester
Good, Ralph W.	Rochester	Gorder, Arne Christian	Rochester
Gorder, Arne Christian	Rochester	Graham, A. Stephens	Rochester
Graham, A. Stephens	Rochester	Greene, Carl Hartley	Rochester
Greene, Carl Hartley	Rochester	Greenlee, Daniel P.	Rochester
Greenlee, Daniel P.	Rochester	Grier, James P.	Rochester
Grier, James P.	Rochester	Habein, Harold C.	Rochester
Habein, Harold C.	Rochester	Haines, S. F.	Rochester
Haines, S. F.	Rochester	Haldeman, Keene Oliver	Rochester
Haldeman, Keene Oliver	Rochester	Hallenbeck, D. F.	Rochester
Hallenbeck, D. F.	Rochester	Hamrick, Robert A.	Rochester
Hamrick, Robert A.	Rochester	Hand, John R.	Rochester
Hand, John R.	Rochester	Hane, Richard Lincoln	Rochester
Hane, Richard Lincoln	Rochester	Hanlon, Frank Robert	Rochester
Hanlon, Frank Robert	Rochester	Harrington, S. W.	Rochester
Harrington, S. W.	Rochester	Hartman, Howard R.	Rochester
Hartman, Howard R.	Rochester	Hartwell, Shattuck W.	Rochester
Hartwell, Shattuck W.	Rochester	Hartzell, John B.	Rochester
Hartzell, John B.	Rochester	Havens, Fred Z.	Rochester
Havens, Fred Z.	Rochester	Heck, Frank Joseph	Rochester
Heck, Frank Joseph	Rochester	Hefke, Hans W.	Rochester
Hefke, Hans W.	Rochester	Heimdahl, Clarence O.	Rochester
Heimdahl, Clarence O.	Rochester	Helmholz, H. F.	Rochester
Helmholz, H. F.	Rochester	Hempstead, B. E.	Rochester
Hempstead, B. E.	Rochester	Hench, Philip S.	Rochester
Hench, Philip S.	Rochester	Henderson, M. S.	Rochester
Henderson, M. S.	Rochester	Herrman, S. F.	Rochester
Herrman, S. F.	Rochester	Heyerdale, O. C.	Rochester
Heyerdale, O. C.	Rochester	Hill, Frederick Charles	Rochester
Hill, Frederick Charles	Rochester	Holland, Wilbur Wallace	Rochester
Holland, Wilbur Wallace	Rochester	Horton, Bayard Taylor	Rochester
Horton, Bayard Taylor	Rochester	Huffman, Lester D.	Los Angeles, Cal.
Huffman, Lester D.	Los Angeles, Cal.	Humiston, Homer W.	Rochester
Humiston, Homer W.	Rochester	Hunt, Henry Franklin	Rochester
Hunt, Henry Franklin	Rochester	Hunt, V. C.	Rochester
Hunt, V. C.	Rochester	Hurt, Algernon Smith, Jr.	Rochester
Hurt, Algernon Smith, Jr.	Rochester	Jacobs, Minard F.	Rochester
Jacobs, Minard F.	Rochester	Johnson, Walter Royle	Rochester
Johnson, Walter Royle	Rochester	Jones, H. T.	Rochester
Jones, H. T.	Rochester	Jones, Robert DuVae	Rochester
Jones, Robert DuVae	Rochester	Jordan, Ferdinand Michael	Rochester
Jordan, Ferdinand Michael	Rochester	Joyce, George Leo	Stewartville
Joyce, George Leo	Stewartville	Joyce, G. T.	Rochester
Joyce, G. T.	Rochester	Judd, E. S.	Rochester
Judd, E. S.	Rochester	Keith, N. M.	Rochester
Keith, N. M.	Rochester	Kennedy, Roger L. J.	Rochester
Kennedy, Roger L. J.	Rochester	Kepler, Edwin J.	Rochester
Kepler, Edwin J.	Rochester	Kernohan, James Watson	Rochester
Kernohan, James Watson	Rochester	Kilbourne, A. F.	Rochester
Kilbourne, A. F.	Rochester	Lacy, Nicholas Eugene	Rochester
Lacy, Nicholas Eugene	Rochester	Larson, Lawrence M.	Rochester
Larson, Lawrence M.	Rochester	Leddy, Eugene T.	Rochester
Leddy, Eugene T.	Rochester	Lemon, W. S.	Rochester
Lemon, W. S.	Rochester	Lillie, H. I.	Rochester
Lillie, H. I.	Rochester	Lillie, W. I.	Rochester
Lillie, W. I.	Rochester	Logan, A. H.	Rochester
Logan, A. H.	Rochester	Loughery, Harold B.	Rochester
Loughery, Harold B.	Rochester	Luden, Georgine	Rochester
Luden, Georgine	Rochester	Lundy, John S.	Rochester
Lundy, John S.	Rochester	Magath, T. B.	Rochester
Magath, T. B.	Rochester	Magee, Henry Ross	Rochester
Magee, Henry Ross	Rochester	Mahorner, Howard Raymond	Rochester
Mahorner, Howard Raymond	Rochester	Malmgren, George F.	Rochester
Malmgren, George F.	Rochester	Margolis, Harry Maurice	Rochester
Margolis, Harry Maurice	Rochester	Marshall, James M.	Rochester
Marshall, James M.	Rochester	Masson, D. M.	Rochester
Masson, D. M.	Rochester	Masson, J. C.	Rochester
Masson, J. C.	Rochester	Mattson, Hamline	Rochester
Mattson, Hamline	Rochester	May, James Alan	Rochester
May, James Alan	Rochester	Mayo, C. H.	Rochester
Mayo, C. H.	Rochester	Mayo, Charles W.	Rochester
Mayo, Charles W.	Rochester	Mayo, Joseph Graham	Rochester
Mayo, Joseph Graham	Rochester	Mayo, W. J.	Rochester
Mayo, W. J.	Rochester	Maytum, Charles K.	Rochester
Maytum, Charles K.	Rochester	McBride, William Percy	Rochester
McBride, William Percy	Rochester	McCann, James C.	Rochester
McCann, James C.	Rochester	McCarty, Ray Bardwell	Rochester
McCarty, Ray Bardwell	Rochester		

McCuskey, Charles F.	Rochester
McKais, Carl B.	Pine Island
McQuiggan, Mark Ronald	Rochester
McVicar, Chas. S.	Rochester
Metheny, David	Rochester
Meyerding, H. W.	Rochester
Miller, Charles D.	Rochester
Mills, Ralph Garfield	Rochester
Moench, L. Mary	Rochester
Moersch, F. P.	Rochester
Moersch, H. J.	Rochester
Mohart, John Henry	Rochester
Montgomery, Hamilton	Rochester
Moore, A. B.	Rochester
Moore, Thomas B.	Rochester
Morton, Herschel B.	Rochester
Mroz, Rudolph John	Rochester
Mulholland, Stanford W.	Rochester
Murphy, George Thomas	Rochester
Murray, James Kenneth P.	Rochester
Mussey, R. D.	Rochester
Nelson, Wallace LeRoy	Rochester
Nesbit, Mark Edwin	Rochester
New, G. B.	Rochester
Nickel, Allen A. C.	Rochester
Norment, William B.	Rochester
Norton, Manville W.	Rochester
Nunn, Leslie Laughlin	Rochester
Nutting, Roland Edward	Rochester
Ochsner, Harold C.	Rochester
Offutt, Susan R.	Rochester
Ohlinger, L. B.	Chicago
O'Leary, P. A.	Rochester
Olson, Ernest A.	Pine Island
Palmer, B. M.	Rochester
Parker, H. L.	Rochester
Parson, George W.	Rochester
Partch, Wallace Taylor	Rochester
Passalacqua, Luis A.	Rochester
Pemberton, J. deJ.	Rochester
Perry, Clarence L.	Rochester

Peterson, Joel Asbury	Rochester
Pfeffer, Theodore John	Rochester
Piper, M. C.	Rochester
Plummer, H. S.	Rochester
Plummer, W. A.	Rochester
Pollock, L. W.	Rochester
Pope, Charles E.	Rochester
Prangen, A. D.	Rochester
Prescott, Manfred U.	Rochester
Prickman, Louis Elwood	Rochester
Priestly, Joseph Biddle	Rochester
Prout, Curtis T.	Rochester
Puestow, Charles Bernard	Rochester
Quale, Victor Sigvold	Rochester
Radtke, H. P.	Rochester
Randall, Lawrence Merrill	Rochester
Rankin, F. W.	Rochester
Rathman, Omer C.	Rochester
Rentschler, Edwin B.	Rochester
Reuter, Maurice Jerome	Rochester
Rienets, John H.	Rochester
Rivers, A. B.	Rochester
Robertson, H. E.	Rochester
Rogers, James C. T.	Rochester
Rosenow, E. C.	Rochester
Rowntree, L. G.	Rochester
Rubenstein, Myer W.	Rochester
Rucker, Charles Wilbur	Rochester
Ruedemann, Eckardt	Rochester
Sanford, A. H.	Rochester
Schacht, Frederick William	Rochester
Shafter, Royce R.	Rochester
Sheldon, W. D.	Rochester
Sistrunk, W. E.	Rochester
Smith, F. L.	Rochester
Smith, Harry L.	Rochester
Smith, Leonard Marshall	Rochester
Smith, Newton D.	Rochester
Smith, William M.	Rochester
Snell, Albert M.	Rochester
Spannuth, John Roy	Rochester

Spooner, Christopher Martin	Rochester
Squire, Fay H.	Rochester
Stacy, L. J.	Rochester
Stark, W. B.	Rochester
Steven, Geo.	Byron
Steward, John Alexander	Rochester
Stuhler, Louis G.	Rochester
Sutherland, C. G.	Rochester
Sussex, Lloyd Thomas	Rochester
Sutton, L. F.	Mazeppa
Thomas, Lester C.	Rochester
Thompson, Fred Rush	Rochester
Thompson, Gersham J.	Rochester
Thompson, H. L.	Rochester
Tinkess, Donald Ewing	Rochester
Valer, T.	Rochester
Vanzant, Frances Ralston	Rochester
Vickery, Eugene B.	Rochester
Viccelli, James Dominic	Rochester
Vinson, P. P.	Rochester
Von Lackum, W. H.	Rochester
Wagner, H. P.	Rochester
Walters, Waltman	Rochester
Watkins, C. H.	Rochester
Weber, H. M.	Rochester
Weir, J. F.	Rochester
Wellbrock, William L. A.	Rochester
Wheeler, Theodora	Rochester
White, Robert Boothe	Rochester
Whitten, Merritt B.	Rochester
Wickham, Mont Cecil	Rochester
Wilder, Russell M.	Rochester
Wilhelm, Charles Martell	Rochester
Williams, Henry Lane, Jr.	Rochester
Willius, F. A.	Rochester
Wilson, L. B.	Rochester
Wolftman, H. W.	Rochester
Wood, H. G.	Rochester
Wright, William C.	Rochester
Yesko, Stephan Aloysius	Rochester
Ziegler, Lloyd Hiram	Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Otter Tail, Wilkin, Grant, and Douglas Counties.

Regular meetings, second Wednesday in January, April, July and October.

Annual meeting, second Wednesday in October.

Haskell, A. D.	President	Alexandria
Satersmoen, Theo.	Secretary	Pelican Rapids
Baker, A. C.	Fergus Falls	
Blakey, A. R.	Osakis	
Boyeson, Peter	Pelican Rapids	
Brabec, F. J.	Perham	
Brabec, P. F.	Perham	
Broker, W. S.	Battle Lake	
Burnap, W. L.	Fergus Falls	
Cowing, P. G.	Evansville	
Drought, W. W.	Fergus Falls	

Esser, John	Perham
Estrem, C. O.	Fergus Falls
Freeborn, J. A.	Fergus Falls
Hand, W. R.	Elbow Lake
Haskell, A. D.	Alexandria
Heiberg, E. A.	Fergus Falls
Houkom, Bjarne	Fergus Falls
Kierland, P. E.	Alexandria
Kemp, M. W.	Fergus Falls
Kittelson, T. N.	Fergus Falls
Lee, W. A.	Fergus Falls
Leibold, H. H.	Parkers Prairie
Lewis, A. J.	Henning
Love, Fred A.	Carlos
Meckstroth, C. W.	Brandon

Meland, Ernest L.	Dalton
Naegeli, Frank	Fergus Falls
Nelson, O. N.	Battle Lake
Nelson, Wallace I.	Underwood
Otto, H. C.	Frazee
Parson, L. R.	Elbow Lake
Patterson, W. L.	Fergus Falls
Paulson, T. S.	Fergus Falls
Satersmoen, Theo.	Pelican Rapids
Sather, E. R.	Alexandria
Sherping, O. Th.	Fergus Falls
Tanquist, E. J.	Alexandria
Vail, James B.	Henning
Wray, W. E.	Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month except June, July and August.

Annual meeting, last Monday of January.

Cole, Wallace	President	St. Paul
Schulze, Albert G.	Secretary	St. Paul
Abbott, J. S.	St. Paul	
Ahrens, A. E.	St. Paul	
Ahrens, A. H.	St. Paul	
Alberts, Max W.	St. Paul	
Alden, J. F.	St. Paul	
Aldes, Harry	St. Paul	
Alexander, F. H.	St. Paul	
Allen, Mason	St. Paul	
Arends, A. L.	St. Paul	
Armstrong, J. M.	St. Paul	
Arnquist, A. S.	St. Paul	
Arouni, Khalil	St. Paul	
Arzt, C. P.	St. Paul	
Aurelius, J. Richards	St. Paul	
Bacon, Donald K.	St. Paul	
Bacon, Knox	St. Paul	
Bacon, L. C.	St. Paul	
Balcome, F. E.	St. Paul	
Bail, C. R.	St. Paul	
Barry, L. W.	St. Paul	

Barness, Nellie	St. Paul
Beadie, W. D.	Cannon Falls
Beals, Hugh	St. Paul
Bell, C. C.	St. Paul
Benepe, L. M.	St. Paul
Bennion, P. H.	St. Paul
Bentley, Norman P.	St. Paul
Berrisford, Paul D.	St. Paul
Binger, H. E.	St. Paul
Birnberg, T. L.	St. Paul
Bock, R. A.	St. Paul
Boeckmann, Egil	St. Paul
Bohland, E. H.	St. Paul
Bole, R. S.	St. Paul
Borg, Joseph F.	St. Paul
Boruma, L. R.	St. Paul
Brand, G. D.	St. Paul
Bray, E. R.	St. Paul
Brimhall, J. B.	St. Paul
Brodie, Walter D.	St. Paul
Brooks, D. F.	St. Paul
Brooks, G. F.	St. Paul
Brown, Edw. I.	St. Paul
Brown, John C.	St. Paul
Brown, S. E.	St. Paul
Burch, F. E.	St. Paul
Burfiend, G. H.	St. Paul

Burns, F. W.	St. Paul
Burns, R. M.	St. Paul
Burton, Carl	St. Paul
Buscher, H.	St. Paul
Caldwell, Jas. P.	St. Paul
Caldwell, Kenneth S.	St. Paul
Cameron, J. A.	St. Paul
Campbell, J. E.	South St. Paul
Cannon, Harry	St. Paul
Carman, C. L.	St. Paul
Carman, Paul I.	St. Paul
Carroll, W. C.	St. Paul
Carter, Fred G.	St. Paul
Chatterton, C. C.	St. Paul
Christiansen, A.	St. Paul
Christison, J. T.	St. Paul
Clark, T. C.	Minneapolis
Colby, Woodward	St. Paul
Cobb, S. G.	St. Paul
Cole, Wallace H.	St. Paul
Collie, H. G.	St. Paul
Colvin, A. R.	St. Paul
Comstock, A. E.	St. Paul
Conner, William H.	Minneapolis
Connor, C. E.	St. Paul
Cook, Paul B.	St. Paul
Countryman, Roger S.	St. Paul

ROSTER OF THE MINNESOTA STATE MEDICAL ASSOCIATION

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Cowern, E. W.	North St. Paul	Holt, John E.	St. Paul	Olson, Chas. A.	St. Paul
Critchfield, L. R.	St. Paul	Howard, W. S.	St. Paul	Ostergren, E. W.	St. Paul
Crump, J. W.	St. Paul	Hulkkrans, Joel C.	St. Paul	Pearson, F. R.	St. Paul
Culligan, J. M.	St. Paul	Hunt, H. E.	St. Paul	Pederson, A. H.	St. Paul
Culligan, Leo Courtney	St. Paul	Ide, A. W.	St. Paul	Penny, L. E.	St. Paul
Dack, L. G.	St. Paul	Ikeda, Kano.	St. Paul	Perry, C. G.	St. Paul
Darling, J. B.	St. Paul	Johnson, Asa M.	St. Paul	Peterson, V. N.	St. Paul
Daugherty, E. B.	St. Paul	Johnson, C. E.	St. Paul	Plondke, F. J.	St. Paul
Daugherty, L. E.	St. Paul	Johnson, H. C.	St. Paul	Prendergast, H. J.	St. Paul
Davis, Herbert	St. Paul	Johnson, Ray G.	St. Paul	Ramsey, W. R.	St. Paul
Davis, William	St. Paul	Johnson, T. H.	St. Paul	Richards, E. T. F.	St. Paul
Deidolph, Karl	St. Paul	Jones, D. C.	St. Paul	Richardson, Harold E.	St. Paul
Deraul, B. I.	St. Paul	Jones, E. M.	St. Paul	Riggs, C. E.	St. Paul
Dickson, Thos. H., Jr.	St. Paul	Kadesky, David	St. Paul	Ritchie, H. P.	St. Paul
Dittman, Geo. C.	St. Paul	Komman, Gordon R.	St. Paul	Rogers, John T.	St. Paul
Dohn, A. J.	St. Paul	Kannary, E. L.	St. Paul	Rosenholtz, Burton	St. Paul
Donohue, Phillip F.	St. Paul	Kelly, John V.	St. Paul	Rosenthal, Robert	St. Paul
Drake, Carl B.	St. Paul	Kelly, Paul	St. Paul	Rothrock, J. L.	St. Paul
Dunn, J. N.	St. Paul	Kennedy, Wm. A.	St. Paul	Roy, Philomena	St. Paul
Dunne, Gerald P.	St. Paul	Kenny, Herman	St. Paul	Rothschild, H. J.	St. Paul
Earl, George A.	St. Paul	King, George L.	St. Paul	Ruhberg, George N.	St. Paul
Earl, Robert O.	St. Paul	King, Z. P.	St. Paul	Rutherford, W. C.	St. Paul
Edlund, G.	St. Paul	Kistler, A. S.	St. Paul	Ryan, John J.	St. Paul
Ely, O. S.	South St. Paul	Klein, H. N.	St. Paul	Ryan, Mark E.	St. Paul
Emerson, E. C.	St. Paul	Knauff, M. K.	St. Paul	Satterlund, Victor	St. Paul
Engberg, E. J.	St. Paul	Kvitrud, G.	St. Paul	Savage, F. J.	St. Paul
Ernest, G. C.	St. Paul	Langenderfer, F. V.	St. Paul	Schock, R. B.	St. Paul
Eshelby, E. C.	St. Paul	Larsen, C. I.	St. Paul	Schons, E. Paul	St. Paul
Fabey, E. W.	St. Paul	Lax, Morris H.	St. Paul	Schuldt, F. C.	St. Paul
Ferguson, J. C.	St. Paul	Leahy, Bartholomew	St. Paul	Schulze, Albert G.	St. Paul
Fessler, Harold H.	St. Paul	Leavenworth, Richard O.	St. Paul	Schwyzler, Arnold	St. Paul
Flagstad, A. E.	St. Paul	Leitch, Archibald	St. Paul	Senkler, G. E.	St. Paul
Fogarty, Charles W.	St. Paul	Leonard, Gilbert John	St. Paul	Setzer, H. J.	St. Paul
Foley, F. E. B.	St. Paul	Lepak, John A.	St. Paul	Shannon, W. Ray	St. Paul
Freeman, C. D.	St. Paul	Lerche, William	St. Paul	Shellman, John L.	St. Paul
Fulton, J. F.	St. Paul	Lewis, W. W.	St. Paul	Shillington, M. A.	St. Paul
Gager, E. C.	St. Paul	Lick, C. Louis	St. Paul	Simon, B. F.	St. Paul
Garbrecht, Arthur	St. Paul	Little, W. J.	St. Paul	Skinner, H. O.	St. Paul
Gardiner, D. G.	St. Paul	Lowe, Earl R.	South St. Paul	Snyder, G. W.	St. Paul
Geer, Everett K.	St. Paul	Lowe, Thomas A.	South St. Paul	Sohlberg, O. I.	St. Paul
Gehlen, J. N.	St. Paul	Lund, Arthur E.	St. Paul	Souster, B. B.	St. Paul
Geist, George A.	St. Paul	Lundholm, A. M.	St. Paul	Sprafka, J. M.	St. Paul
Ghent, C. Harry	St. Paul	McBeath, Ewing C.	New York City	Stern, E. G.	St. Paul
Ghent, M. M.	St. Paul	McCarthy, W. R.	St. Paul	Stern, O. W.	St. Paul
Gillilan, J. S.	St. Paul	McClanahan, J. H.	White Bear	Stevens, F. A.	Lake Elmo
Ginsberg, Wm.	St. Paul	McClanahan, T. S.	White Bear	Stewart, Alexander	St. Paul
Goltz, E. V.	St. Paul	McCloud, C. N.	St. Paul	Stierle, Adolph, Jr.	St. Paul
Grant, H. W.	St. Paul	McKeon, Owen	St. Paul	Stinnette, S. E.	St. Paul
Gratzek, Thomas	St. Paul	McLaren, Jennette M.	St. Paul	Stolpestad, H. L.	St. Paul
Greene, Charles L.	St. Paul	McNevin, C. F.	St. Paul	Swanson, Edwin O.	St. Paul
Gruenhagen, Arnold P.	St. Paul	Martineau, J. L.	St. Paul	Swanson, John A.	St. Paul
Hagaman, Geo. K.	St. Paul	Meyerding, E. A.	St. Paul	Swenson, J. J.	St. Paul
Hall, A. R.	St. Paul	Mitchell, Frederick	St. Paul	Taylor, H. L.	St. Paul
Hall, Henry H.	St. Paul	Mogilner, S. N.	St. Paul	Telsburg, C. B.	St. Paul
Halper, Philip	St. Paul	Molander, H. A.	St. Paul	Tiber, L. J.	St. Paul
Hammes, E. M.	St. Paul	Moquin, Marie A.	St. Paul	Tregilas, H. R.	South St. Paul
Hammond, J. F.	St. Paul	Morrissey, F. B.	St. Paul	Van Slyke, Charles A.	St. Paul
Harmon, G. E.	St. Paul	Mortensen, N. G.	St. Paul	Vonder Weyer, William	St. Paul
Hartfel, Wm. F.	St. Paul	Moss, Myer N.	St. Paul	Waas, Charles William	St. Paul
Hartley, E. C.	St. Paul	Moynihan, T. J.	St. Paul	Walker, R. E.	St. Paul
Hauser, V. P.	St. Paul	Muller, R. Theo.	St. Paul	Wallinga, John H.	St. Paul
Hawkins, V. J.	St. Paul	Myers, Thos.	St. Paul	Warnock, R. W.	St. Paul
Heath, A. C.	St. Paul	Ncher, F. H.	St. Paul	Warren, E. L.	St. Paul
Heck, Wm. W.	St. Paul	Nelson, L. A.	St. Paul	Welch, M. C.	St. Paul
Hedenstrom, Frank G.	St. Paul	Nesbit, Harold T.	St. Paul	Werner, O. S.	St. Paul
Hengstler, W. H.	St. Paul	Nippert, H. T.	St. Paul	Wheeler, M. W.	St. Paul
Hensel, C. N.	St. Paul	Nordin, C. G.	St. Paul	Whitacre, J. C.	St. Paul
Herrmann, Edgar T.	St. Paul	Norris, Edgar H.	St. Paul	Whitcomb, Ed. H.	St. Paul
Hesselgrave, S. S.	St. Paul	Nye, Katherine A.	St. Paul	White, J. S.	St. Paul
Hilger, A. W.	St. Paul	O'Brien, H. J.	St. Paul	Whitmore, Frank W.	St. Paul
Hilger, L. D.	St. Paul	O'Connor, I. A.	St. Paul	Whitney, A. W.	St. Paul
Hilger, L. A.	St. Paul	O'Connor, J. P.	St. Paul	Williams, Clayton K.	St. Paul
Hiniker, Louis P.	St. Paul	Oerting, Harry	St. Paul	Williamson, Geo. A.	St. Paul
Hochfizer, J. J.	St. Paul	Ogden, Warner	St. Paul	Winnick, J. B.	St. Paul
Hoff, Alfred	St. Paul	Ohage, Justus	St. Paul	Wold, K. C.	St. Paul
Hoffman, Max H.	St. Paul	Ohage, Justus, Jr.	St. Paul	Wolfe, H. C.	St. Paul
Holcomb, J. T.	St. Paul			Zander, C. H.	St. Paul
Holcomb, O. W.	St. Paul			Zimmermann, H. B.	St. Paul

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, at call of president.

Annual meeting, June.

Weiser, Geo. B.	President	New Ulm	Gibbons, Francis C.	Comfrey	Saffert, Cornelius A.	New Ulm
Meierding, Wm. A.	Secretary	New Ulm	Goblirsch, A. P.	Sleepy Eye	Scherer, Roland G.	Morgan
Abraham, Arden L.		Gibson	Hammermeister, Theo.	New Ulm	Schoch, J. L.	New Ulm
Dubbe, F. H.		New Ulm	Hovde, Rolf	Winthrop	Seifert, Otto J.	New Ulm
Eckstein, A. W.		Mankato	Jamieson, Earl	Walnut Grove	Shrader, J. S.	Springfield
Fauth, Karl J.		Mankato	Just, H. J.	Lafayette	Strickler, Mary R.	Sleepy Eye
Fritsche, Albert		New Ulm	Kiefer, M. A.	Sleepy Eye	Vogel, Joseph	New Ulm
Fritsche, L. A.		New Ulm	Kolset, Karl D.	Sanborn	Weiser, Geo. B.	New Ulm
			Meierding, Wm. A.	New Ulm	Wellcome, J. W. B.	Sleepy Eye
			Pederson, O. J.	Hanska	Wohlrahe, Clarence F.	Springfield
			Peterson, R. A.	Vesta	Wohlrahe, E. J.	Springfield
			Reineke, Geo. F.	New Ulm	Weissgerber, L. A.	New Ulm
			Rothenburg, J. C.	Springfield		

*Deceased

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Marshall, Polk, Roseau, Pennington, Red Lake, Norman
and Mahanomen Counties.Regular meetings, April, September, December.
Annual meeting, December.

President	
Froehlich, H. W.	Thief River Falls
Secretary	
Dean, Arthur C.	Crookston
Adkins, C. M.	Grygla
Anderson, J. K.	Minneapolis
Anderson, W. S.	Minneapolis
Bernard, B. C.	Thief River Falls
Bertelson, O. L.	Crookston
Biedermann, Jacob	Thief River Falls
Biegen, H. M.	Warren
Bowers, J. T.	Thief River Falls
Bratrud, O. Edw.	Warren
Bratrud, Theodor	Warren
Brousseau, J. E.	Argyle
Brown, Lyle L.	Crookston
Button, A. J.	Greenbush
Dean, Arthur C.	Crookston

Delmore, J. L.	Roseau
Dunlop, Alex H.	Crookston
Edstrom, Henry	Crookston
Engstrand, Oscar J.	Warren
Erickson, J. L.	Twin Valley
Froehlich, H. W.	Thief River Falls
Griffin, P. J.	Fertile
Hansen, M.	Ada
Henney, Wm. H.	McIntosh
Hodgson, H. H.	Crookston
Hollands, W. H.	Fisher
Holmes, W. B.	Ada
Holte, H.	Crookston
Kahala, Arthur	Crookston
Kirk, G. P.	East Grand Forks
Larson, A. L.	Philadelphia
Leitch, N. M.	Warroad
Locken, O. E.	Crookston
Melby, O. F.	Thief River Falls
Mercil, Wm. F.	Crookston

Morley, G. A.	Crookston
Nelson, H. E.	Crookston
Norman, J. F.	Crookston
Ohnstad, J. L.	McIntosh
Oppegaard, C. L.	Crookston
Oppegaard, M. O.	Crookston
Overend, K. V.	Hallok
Roy, J. A.	Red Lake Falls
Sather, Allen	Fosston
Shaleen, A. W.	Hallok
Shedlov, A.	Fosston
Shelland, J. T.	Ada
Stratte, J. J.	Hallok
Svedenberg, A. W.	Thief River Falls
Tessier, W. O.	Oklee
Turnbull, Robert	Fosston
Vistaum, P. S.	Shelly
Watson, N. M.	Red Lake Falls
Wattam, G. S.	Warren
Wilstrout, I. Geo.	Oslo

RICE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, December.

President	
Wilson, Warren	Northfield
Secretary	
Plonske, C. J.	Faribault
Babcock, F. M.	Northfield
Beede, Ethel R.	Faribault
Backe, Edmund	Kenyon
Davis, F. U.	Faribault
Dungay, Neil S.	Northfield
Francis, David W.	Morristown
Haessly, S. B.	Faribault

Hanson, A. M.	Faribault
Haskins, John L.	New York
Haynes, A. L.	Faribault
Huxley, F. R.	Faribault
Kanne, C. W.	Faribault
Lexa, F. J.	Lonsdale
McBroom, D. E.	Cambridge
Mayland, M. L.	Faribault
Meyer, P. F.	Faribault
Moses, Joseph, Jr.	Northfield
Murdoch, J. M.	Faribault
Neseth, O. S.	Kenyon

Plonske, C. J.	Faribault
Robilliard, C. M.	Faribault
Robilliard, W. H.	Faribault
Rumpf, C. W.	Faribault
Rumpf, W. H.	Faribault
Smith, P. A.	Faribault
Thorsen, Orin P.	Northfield
Traeger, C. A.	Faribault
Wall, C. R.	Northfield
Warren, F. S.	Faribault
Wilson, Warren	Northfield
Wilson, W. E.	Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY

St. Louis, Lake, Cook, and Carlton Counties.
Regular meetings, second Thursday each month.
Annual meeting, second Thursday, October.

President	
Tuohy, E. L.	Duluth
Secretary	
Elias, F. J.	Duluth
Abbott, Wm. P.	Duluth
Adams, B. S.	Hibbing
Alexander, Clifford E.	Duluth
Anderson, Hilding C.	Duluth
Arminen, K. V.	Duluth
Armstrong, E. L.	Duluth
Athens, A. G.	Duluth
Ayres, G. T.	Ely
Bagley, W. R.	Duluth
Bakkila, Henry	Duluth
Bardon, Richard	Duluth
Barney, L. A.	Duluth
Benson, Otis O.	Soudan
Berdz, G. L.	Duluth
Bergquist, K. E.	Duluth
Bianco, A. J.	Duluth
Binet, H. E.	Grand Rapids
Birkeland, O. N.	Hibbing
Blacklock, S. S.	Hibbing
Blakely, C. C.	Barnum
Block, Phoebe P.	Virginia
Boman, P. G.	Duluth
Bowen, Robert L.	Hibbing
Boyer, S. H.	Duluth
Braden, A. J.	Duluth
Bradley, E. L.	Marion, Ohio
Braverman, N. J.	Duluth
Bray, C. W.	Biwabik
Bullen, F. W.	Hibbing
Burns, R. L.	Two Harbors
Cantwell, F. W.	International Falls
Carstens, C. F.	Hibbing
Chapman, T. L.	Duluth
Cheney, E. L.	Duluth
Christensen, E. P.	Two Harbors
Clement, T. G.	Duluth
Collins, A. N.	Duluth
Collins, H. C.	Duluth

Cosgrove, J. H.	Duluth
Coventry, W. A.	Duluth
Davis, B. F.	Duluth
Davis, H. S.	Duluth
Doolittle, L. E.	Duluth
Drenning, F. C.	Duluth
Eckman, P. F.	Duluth
Eisenman, W. G.	Chisholm
Ekblad, J. W.	Duluth
Eklund, W. J.	Duluth
Elias, F. J.	Duluth
Eppard, R. M.	Cloquet
Estrem, T. A.	Hibbing
Ewens, H. B.	Virginia
Ferreira, G. J.	Duluth
Fischer, Mario McC	Duluth
Fleming, J.	Cloquet
Forbes, Robert S.	Duluth
Froats, C. W.	Eveleth
Gillespie, M. G.	Duluth
Gillespie, N. H.	Duluth
Gowan, L. R.	Duluth
Graham, David	Duluth
Graham, R. D.	Duluth
Graham, Robert	Duluth
Graves, W. N.	Duluth
Grawn, F. A.	Duluth
Greeley, L. Q.	Duluth
Ground, H. T.	Virginia
Haney, C. L.	Duluth
Harris, C. N.	Chisholm
Hathaway, S. J.	Proctor
Hatch, W. E.	Duluth
Hayes, M. F.	Nashauk
Heimark, O. E.	Duluth
Hill, F. E.	Duluth
Hirschfield, M. S.	Duluth
Hirschboeck, F. J.	Duluth
Hovde, H.	Cloquet
Huseby, H. W.	Cloquet
Jacobson, Clarence	Chisholm
Jensen, T. J.	Duluth
Kean, N. D.	Coleraine
Kerlan, M.	Bemidji
Keyes, C. R.	Duluth

Kiesling, I. H.	Nashauk
King, W. S.	Eveleth
Klein, Harry	Duluth
Kliman, F. E.	Duluth
Knaapp, F. N.	Duluth
Kohlbr, C. O.	Duluth
Kraft, P.	Duluth
Kuth, J. R.	Duluth
Laird, A. T.	Nopeming
Lenont, C. B.	Virginia
Lepak, F. J.	Duluth
Litman, Samuel N.	Duluth
Loofbourrow, E. H.	Keewatin
Lum, C. E.	Duluth
McCarty, P. D.	Ely
McComb, C. F.	Duluth
McCoy, Mary	Duluth
McDaniel, S. P.	Mountain Iron
McDonald, A. L.	Duluth
McGiffert, E. N.	Duluth
McHaffie, O. L.	Duluth
McIntyre, E. H.	Virginia
McNutt, John R.	Barum
McRaby, Fred	Hibbing
Macfarlane, P. H.	Chisholm
MacRae, Gordon C.	Duluth
Magie, W. H.	Duluth
Magney, F. H.	Duluth
Manley, J. R.	Duluth
Martin, Edw. T.	Duluth
Martin, W. C.	Duluth
Matill, P. M.	Oak Terrace
Mayne, R. M.	Duluth
Merriman, L. L.	Duluth
Moe, Thos.	Moose Lake
Moe, Russel J.	Duluth
Monroe, P. B.	Two Harbors
More, C. W.	Eveleth
Morsman, L. W.	Hibbing
Morris, C.	Zumbrota
Murray, D. D.	Duluth
Nelson, E. H.	Chisholm
Nelson, R. L.	Duluth
Nicholson, M. A.	Duluth
Oredson, O. A.	Duluth

Olson, A. E. Duluth
Pake, S. G. Duluth
Parker, O. W. Ely
Payette, C. H. Duluth
Pennie, D. F. Duluth
Power, J. E. Duluth
Radquist, C. S. Hibbing
Rahala, John Virginia
Raiter, Franklin W. S. Cloquet
Raiter, Roy F. Cloquet
Rapp, E. W. Duluth
Robinson, J. M. Duluth
Rood, D. C. Duluth
Rowe, O. W. Duluth
Rudie, P. S. Duluth
Ryan, W. J. Duluth
St. Clair, G. G. Duluth

Scherer, C. A. Duluth
Schroder, C. H. Duluth
Seashore, D. E. Duluth
Shapiro, E. Z. Duluth
Shaw, A. W. Buhl
Sisler, C. E. Grand Rapids
Slyfield, F. F. Duluth
Smith, C. M. Duluth
Smith, E. K. Duluth
Spicer, F. W. Duluth
Strathern, M. L. Gilbert
Strobel, W. G. Duluth
Stuart, A. B. Cloquet
Sukeforth, L. A. Duluth
Sutherland, H. N. Ely
Swenson, A. O. Duluth
Taylor, C. W. Duluth

Tibbetts, M. H. Duluth
Tilderquist, D. L. Duluth
Tuohy, E. L. Duluth
Urberg, S. E. Duluth
Vercellini, C. E. Duluth
Vivian, R. S. Hibbing
Walker, A. E. Duluth
Webber, Edw. E. Duluth
Weber, M. L. Duluth
Webster, H. E. Duluth
Weirick, Howard R. Hibbing
Wheeler, D. W. Duluth
Wilkinson, Stella. Duluth
Winter, J. A. Duluth
Young, T. O. Duluth
Young, V. A. Duluth
Zlatovski, M. Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, every two months in Winter—Every month in Summer.

Annual meeting, in June.

Fischer, H. P. President Shakopee
Simons, B. H. Secretary Chaska
Bohland, F. J. Belle Plaine
Buck, F. H. Shakopee
Cervenka, Charles F. New Prague

Eklund, E. J. Norwood
Fischer, H. P. Shakopee
Fischer, P. M. Shakopee
Henriksen, H. G. Elko
Hebeisen, M. B. Carver
Juergens, H. M. Belle Plaine
Kolara, J. J. Le Sueur Center
McKeon, James St. Paul
Maertz, W. F. New Prague

Nagel, H. D. Waconia
Novak, E. E. New Prague
Olson, Chester J. Belle Plaine
Phillips, W. Jordan
Reiter, H. W. Shakopee
Schneider, H. A. Jordan
Simons, Bernard H. Chaska
Westerman, A. E. Montgomery
Westerman, F. C. Montgomery

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties.

Regular meetings, May and October.

Annual meeting, October.

Hitchings, W. S. President Lakefield
McKeown, E. G. Secretary Pipestone
Arnold, E. W. Adrian
Benjamin, M. B. Jasper
Benjamin, W. G. Pipestone
Bolenkamp, F. W. Luverne
Bong, J. H. Jasper
Brown, A. H. Pipestone
Chadbourne, A. G. Heron Lake
Cress, P. J. Ellsworth
DeBoer, Hermanus Edgerton
Ditmeyer, L. M. Gerber Jasper
Dolan, C. F. Worthington

Doms, H. C. Slayton
Dudley, J. H. Windom
Golden, C. M. Tyler
Halloran, Walter. Jackson
Hilger, J. M. Iona
Hitchings, W. S. Lakefield
Johnson, Ellsworth. Windom
Kelling, Louis F. Lakefield
Kendahl, A. M. Jasper
Kilbride, E. A. Worthington
Leebens, J. H. Lismore
Lowe, Thos. Pipestone
McCrea, James Fulda
McKeown, E. G. Pipestone
Manson, F. M. Worthington
Mork, B. O. Worthington
Nusbaum, D. H. Jackson
Patterson, W. E. Westbrook

Piper, Wm. A. Mountain Lake
Richardson, W. E. Pipestone
Rose, J. T. Lakefield
Roust, H. A. Montevideo
Sherman, C. L. Luverne
Smallwood, J. T. Worthington
Slater, S. A. Worthington
Sogge, L. Windom
Stanley, C. R. Worthington
Taylor, Wm. J. Pipestone
Thorsen, E. O. Luverne
Tiedemann, Elmer J. Adrian
Tofte, Josephine. Dawson
Waller, Joseph D. Wilmont
Watson, F. G. Worthington
Wright, C. O. Luverne
Williams, A. B. St. Paul
Williams, Leon A. Slayton

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday, January, April, July and October.

Annual meeting, April.

Mahowald, A. President Albany
McDowell, J. P. Secretary St. Cloud
Boehm, J. C. St. Cloud
Brigham, C. F. St. Cloud
Clark, H. B. St. Cloud
Du Bois, J. A. Sauk Center
Du Bois, J. F. Sauk Center
Fleming, T. N. St. Cloud
Freeman, W. L. St. Cloud
Friesleben, Wm. Sauk Rapids

Gelz, J. J. St. Cloud
Goehrs, H. W. St. Cloud
Haberman, E. Osakis
Halenbeck, Philip L. St. Cloud
Hemstead, Werner. St. Cloud
Johnson, Walfred. Sauk Center
Jones, Richard N. St. Cloud
Kern, M. J. E. M. St. Cloud
Kingsbury, D. W. Clearwater
Kohler, D. W. St. Joseph
Koop, Herman E. Cold Springs
Koop, S. H. Richmond
Kuhlman, August. Melrose
Lewis, C. B. St. Cloud
Libert, J. N. St. Cloud

McDowell, J. P. St. Cloud
McKibben, H. E. St. Cloud
Mahowald, A. Albany
Meyer, A. A. Melrose
Moynihan, A. F. Sauk Center
Myre, C. R. Paynesville
Rathbun, A. M. Rice
Rathbun, C. A. St. Cloud
Richards, W. B. St. Cloud
Ridgway, Alexander. Belgrade
Schatz, F. J. St. Cloud
Sutton, Chas. St. Cloud
Sherwood, G. E. Kimball
Townsend, DeWayne. Brooten
Zachman, A. H. Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, odd months, second Tuesday.

Annual meeting, November.

Nelson, Ernest J. Vice President Owatonna
Hart, Alfred B., Jr. Secretary Owatonna

Ertel, E. O. Ellendale
Gault, C. C. Owatonna
Hart, Alfred B., Jr. Owatonna
McIntyre, John A. Owatonna
Melby, Benedik. Blooming Prairie

Nelson, Ernest J. Owatonna
Quigley, T. C. Owatonna
Senn, E. W. Owatonna
Smersh, J. F. Owatonna
Stewart, A. B. Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching,
Hubbard, Itasca, and Beltrami Counties.
Regular meetings, January, Fall, Summer.
Annual meeting, Jan. 31, 1929.

President
Davis, T. L. Wadena
Secretary
Badeaux, G. I. Brainerd
Agnew, Allen T. International Falls
Allen, F. A. Crosby
Allen, F. H. Staples
Anderson, C. E. Brainerd
Amundson, A. E. Little Falls
Badeaux, G. I. Brainerd
Beise, R. A. Brainerd
Christie, G. R. Long Prairie
Christie, R. L. Long Prairie
Corrigan, J. E. Spooner
Corse, C. A. Verdale
Craig, C. C. International Falls
Davis, Thayer C. Wadena
Davis, L. Thomas Wadena
Forrest, C. G. Clearbrook
Frost, Harry T. Wadena
Gaalaas, A. F. Wadena

Gerber, Milo P. Brainerd
Grogan, J. S. Wadena
Groschup, Theo. P. Bemidji
Grose, Fredk. N. Clarissa
Hawkinson, L. F. Brainerd
Healy, R. T. Pierz
Hilton, J. M. Browerville
Holst, C. F. Little Falls
Holst, J. B. Little Falls
House, Z. E. Cass Lake
Jacobson, David J. Blackduck
Johnson, E. W. Bemidji
Johnson, O. V. Sebeka
Kenyon, Paul Wadena
Kerlan, S. Z. Aitkin
Laney, R. L. Puposky
Lodmell, Elmer Wadena
Marcum, E. H. Bemidji
McHugh, R. F. Aitkin
Larson, L. M. St. Paul
Laughlin, J. T. Grey Eagle

McKinnon, J. J. Wadena
Miller, W. A. New York Mills
Moyer, Ralph E. Bemidji
Nelson, Nesmith Brainerd
Ortman, John W. Pierz
Osborn, Burt F. International Falls
Parrott, B. W. Wadena
Pierce, Chas. H. Long Prairie
Roberts, L. M. Little Falls
Shannon, S. S. Crosby
Simons, Edwin J. Swanville
Smith, B. A. Crosby
Stewart, N. W. Brainerd
Strader, E. L. Deerwood
Thabes, J. A., Sr. Brainerd
Thabes, J. A., Jr. Brainerd
Van Valkenberg, B. F. Long Prairie
Van Valkenberg, F. W. Long Prairie
Watson, A. M. Royalton
Will, W. W. Bertha
Williams, R. J. Pine River
Wilcox, F. L. Walker

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July.

President
Dempsey, D. P. Kellogg
Secretary
Wilson, W. F. Lake City
Bayley, E. C. Lake City

Bowers, H. E. Lake City
Cochrane, W. J. Lake City
Collins, J. S. Wabasha
Dempsey, D. P. Kellogg
Fleischhauer, D. S. Wabasha
Frost, Russell H. Wabasha

Muir, E. C. Minneiska
Radabaugh, R. C. Hastings
Replogle, W. H. Wabasha
Slocumb, J. A. Plainview
Stryker, W. B. Plainview
Wilson, W. F. Lake City

WASECA COUNTY MEDICAL SOCIETY

Annual meeting, December.

President
McIntire, H. M. Waseca
Secretary
Swenson, O. J. Waseca

Bernstein, Wm. C. New Richland
Blanchard, H. G. Fairmont
Gallagher, B. J. Waseca
Hagen, H. O. New Richland
Leopard, B. A. Bywood, Pa.
McIntire, H. M. Waseca

Miller, H. A. Fairmont
O'Hara, J. J. Janesville
Salterman, B. I. Janesville
Swartwood, F. A. Waseca
Swenson, O. J. Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of month.

Annual meeting, second Tuesday in January.

President
Sherman, C. H. Bayport
Secretary
Sherwood, K. K. Stillwater
Boleyn, E. S. Stillwater

Combacker, L. C. Fergus Falls
Culver, Lucian G. Stillwater
Haines, J. H. Stillwater
Humphrey, W. R. Stillwater
Joseski, R. J. Stillwater
Kalinoff, D. Stillwater

Mingo, F. E. Hugo
Poirier, J. A. Forest Lake
Sherman, Carnot H. Bayport
Sherwood, K. K. Stillwater
Stuhr, J. W. Stillwater
Thompson, V. C. Marine

WATONWAN COUNTY MEDICAL SOCIETY

Regular meetings, on call.

Annual meeting, December.

President
Thompson, Albert St. James
Secretary
Grimes, H. B. Madelia

Bergman, O. B. St. James
Bregel, Fred L. St. James
Grimes, H. B. Madelia
Hagen, O. E. Butterfield

Haynes, B. H. St. James
McCarthy, W. J. Madelia
Thompson, Albert St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Traverse, Pope and Stevens Counties.

Regular meetings, every three months.

Annual meeting, October.

President
Gibbon, L. L. Lowry
Secretary
Linde, Herman Cyrus
Bates, B. V. Browns Valley
Bergan, Otto Clinton
Bolsta, Chas. Ortonville

Caine, C. E. Morris
Christenson, C. R. Starbuck
Eberlin, E. A. Glenwood
Elsner, J. R. Glenwood
Ewing, C. F. Wheaton
Gibbon, L. L. Lowry
Giesen, A. F. Starbuck
Judge, Walter T. Graceville
Karn, B. R. Ortonville

Leland, John T. Herman
Leuty, Amos Morris
Lindberg, A. L. Wheaton
Linde, Herman Cyrus
O'Donnell, D. M. Ortonville
Oliver, C. I. Graceville
Pierson, Claude M. Wheaton
Shelver, H. J. Ortonville
Weir, J. D. Beardsley

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.
Annual meeting, January.

President
Pritchard, D. B. Winona

Secretary
Steiner, I. W. Winona

Benoit, F. T. Winona
Clay, F. H. St. Charles
Heise, W. F. C. Winona
Keyes, E. D. Winona

Lichtenstein, H. Winona
Lindsay, W. V. Winona
McDonnell, C. H. Winona
McLaughlin, E. M. Winona
Mattison, P. A. Winona
Meinert, A. E. Winona
Nauth, W. W. Winona
Neumann, C. A. Lewiston
Page, R. L. St. Charles

Pritchard, D. B. Winona
Risser, E. D. Winona
Robbins, C. P. Winona
Satterlee, H. W. Lewiston
Schaefer, S. Winona
Schnarrenberger, G. Winona
Steiner, I. W. Winona
Tweedy, G. J. Winona
Walker, G. H. Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, October, first Tuesday after first Monday.

President
Klaveness, E. Monticello

Secretary
Catlin, John J. Buffalo
Catlin, John J. Buffalo
Ellison, Frank E. Monticello

Freed, O. J. R. Cokato
Harriman, L. Howard Lake
Klaveness, E. Monticello
Lee, J. L. Watertown
Moffatt, A. G. Howard Lake
Norris, G. H. Annandale
Northey, T. M. Rockford

Peterson, O. L. Cokato
Phillips, A. E. Delano
Ridgway, A. M. Annandale
Roholt, C. L. Waverly
Rousseau, Victor. Maple Lake
Swezey, B. F. Buffalo
Thorsen, Thor. Oslo, Norway

ALPHABETICAL ROSTER

Aanes, A. M.	Red Wing	Baker, Looe	Minneapolis	Bohland, E. H.	St. Paul
Abbott, J. S.	St. Paul	Bakke, O. H.	Minneapolis	Bohland, F. J.	Belle Plaine
Abbott, Walter D.	Rochester	Bakkila, Henry	Duluth	Bohling, B. S.	Sandstone
Abbott, Wm. P.	Duluth	Balcome, F. E.	St. Paul	Boies, Lawrence R.	Minneapolis
Aborn, W. H.	Hawley	Baldwin, A. E.	Houston	Bole, R. S.	St. Paul
Abraham, Arden L.	Gibson	Balfour, D. C.	Rochester	Boleyn, E. S.	Stillwater
Adair, F. L.	Minneapolis	Ball, C. R.	St. Paul	Boista, Chas.	Ortonville
Adams, B. S.	Hibbing	Bannick, Edwin G.	Rochester	Boman, P. G.	Duluth
Adams, R. C.	Bird Island	Barber, J. P.	Minneapolis	Bombberger, C. B.	Mapleton
Adams, R. T.	Mantorville	Barborka, C. J.	Rochester	Bonesteel, Henry T. S.	Rochester
Adams, S. Franklin	Rochester	Bardon, Richard	Duluth	Bong, J. H.	Jasper
Adkins, C. M.	Grygla	Barney, L. A.	Duluth	Bonta, M. B.	Rochester
Adson, A. W.	Rochester	Bargen, J. Arnold	Rochester	Booth, A. E.	Minneapolis
Agnew, Allen T.	International Falls	Barker, Nelson W.	Rochester	Boothby, W. M.	Rochester
Ahrens, A. E.	St. Paul	Barnes, A. R.	Rochester	Boquist, E. T. W.	Minneapolis
Ahrens, A. H.	St. Paul	Barr, W. H.	Wells	Boquist, Harold S.	Minneapolis
Aitkens, H. B.	LeSueur Center	Barron, Moses	Minneapolis	Borg, Joseph F.	St. Paul
Akester, Ward	Marshall	Barry, L. W.	St. Paul	Borgeson, Egbert J.	Minneapolis
Alberts, Max W.	St. Paul	Barsness, Nellie	St. Paul	Bossingham, O. N.	Lake Benton
Alden, J. F.	St. Paul	Barton, E. R.	Minneapolis	Bottolfson, B. T.	Moorhead
Aldes, Harry	St. Paul	Bass, G. W.	Minneapolis	Bouma, L. R.	St. Paul
Aldrich, F. H.	Belview	Bates, B. V.	Browns Valley	Bouman, H. A.	Minneapolis
Alexander, Clifford E.	Duluth	Baxter, S. H.	Minneapolis	Bowen, Robert L.	Hibbing
Alexander, F. H.	St. Paul	Bayley, E. C.	Lake City	Bowers, H. E.	Lake City
Allen, Frank N.	Rochester	Bayard, Harry F.	Rochester	Bowers, I. T.	Thief River Falls
Allen, A. W.	Austin	Beach, W. A.	Mankato	Bowing, H. H.	Rochester
Allen, Chas. C.	Austin	Beadie, W. D.	Cannon Falls	Bowles, John H.	Rochester
Allen, Edgar V.	Rochester	Beals, Hugh	St. Paul	Boyer, S. H.	Duluth
Allen, F. A.	Crosby	Beard, Archie H.	Minneapolis	Boynton, Ruth	Minneapolis
Allen, F. H.	Staples	Beard, R. O.	Minneapolis	Boysen, H.	Welcome
Allen, H. W.	Minneapolis	Beaver, M. G.	Rochester	Boysen, Peter	Pelican Rapids
Allen, Mason	St. Paul	Bedford, E. W.	Minneapolis	Braasch, Wm. F.	Rochester
Allen, Roy W.	Rochester	Behmmer, F. W.	Appleton	Brabec, F. F.	Perham
Allen, W. A.	Rochester	Beede, Ethel R.	Faribault	Brabec, P. F.	Perham
Allison, R. G.	Minneapolis	Beise, R. A.	Brainerd	Bracken, H. M.	Claremont, Cal.
Almquist, H. E.	Minneapolis	Bell, E. T.	Minneapolis	Braden, A. J.	Duluth
Altnow, Hugo O.	Minneapolis	Bell, C. C.	St. Paul	Bradley, E. L.	Marion, Ohio
Alvarez, Walter C.	Rochester	Bell, J. W.	Minneapolis	Brand, G. D.	St. Paul
Amberg, Samuel	Rochester	Belote, G. B.	Caledonia	Brand, W. A.	Redwood Falls
Amundson, A. E.	Little Falls	Benedict, E. E.	Minneapolis	Branhram, D. S.	Albert Lea
Anderson, A. E.	Minneapolis	Benedict, W. L.	Rochester	Branton, A. F.	Willmar
Anderson, Arnt G.	Minneapolis	Benep, M.	St. Paul	Branton, B. J.	Willmar
Anderson, Arnold S.	St. Paul	Benham, E. W.	Mankato	Bratrud, E. F.	Minneapolis
Anderson, C. E.	Brainerd	Benjamin, A. E.	Minneapolis	Bratrud, O. Edw.	Warren
Anderson, C. M.	Rochester	Benjamin, M. B.	Jasper	Bratrud, Theodore	Warren
Anderson, David D.	Minneapolis	Benjamin, W. G.	Pipestone	Bratrude, E. J.	Rochester
Anderson, Edward D.	Minneapolis	Benn, F. G.	Minneapolis	Braverman, N. J.	Duluth
Anderson, Ernest R.	Minneapolis	Bennion, P. H.	St. Paul	Bray, C. W.	Biwabik
Anderson, E. W.	Rochester	Benoit, P. T.	Winona	Bray, E. R.	St. Paul
Anderson, Hilding C.	Duluth	Benson, Ois O.	Soudan	Bregel, Fred L.	St. James
Anderson, J. K.	Minneapolis	Bentley, Norman P.	St. Paul	Brigham, C. F.	St. Cloud
Anderson, Mark J.	Rochester	Berdez, G. L.	Duluth	Brigham, Frank	Watkins
Anderson, Norman E.	Harmony	Bergan, Otto	Clinton	Brimhall, J. B.	St. Paul
Anderson, R. E.	Willmar	Bergheim, M. C.	Hawley	Brodie, Walter D.	St. Paul
Anderson, Reuben M.	Rochester	Berglund, Hilding	Minneapolis	Broders, A. C.	Rochester
Anderson, Richard S.	Rochester	Bergman, O. B.	St. James	Broker, W. S.	Battle Lake
Anderson, Silas C.	Minneapolis	Bergh, L. N.	Montevideo	Brooks, D. F.	St. Paul
Anderson, S. H.	Red Wing	Bergquist, K. E.	Duluth	Brooks, G. F.	St. Paul
Anderson, S. N.	Minneapolis	Berkman, J. M.	Rochester	Brousseau, J. E.	Argyle
Andrews, J. W.	Mankato	Berkman, John M.	Rochester	Brown, A. H.	Rochester
Andrews, R. N.	Mankato	Bernard, B. C.	Thief River Falls	Brown, A. H.	Pipestone
Andrews, R. S.	Minneapolis	Bernstein, Wm. C.	New Richland	Brown, C. B.	Rochester
Annis, H. B.	Minneapolis	Berrisford, Paul D.	St. Paul	Brown, Edgar D.	Minneapolis
Archibald, Frank M.	Mahnomen	Bertelson, O. L.	Crookston	Brown, Ed. I.	St. Paul
Arends, A. L.	St. Paul	Bessesen, A. N.	Minneapolis	Brown, Edw. J.	Minneapolis
Arey, H. C.	Excelsior	Bessesen, Al. N., Jr.	Minneapolis	Brown, G. E.	Rochester
Arminen, K. V.	Duluth	Bessesen, Daniel H.	Minneapolis	Brown, John C.	St. Paul
Armstrong, E. L.	Duluth	Bessesen, W. A.	Minneapolis	Brown, Lyle L.	Crookston
Armstrong, Harry G.	Minneapolis	Best, F. E.	Wells	Brown, P. W.	Rochester
Armstrong, J. M.	St. Paul	Bianco, A. J.	Duluth	Brown, S. E.	St. Paul
Arnold, E. W.	Adrian	Biedermann, Jacob	Thief River Falls	Browning, W. E.	Caledonia
Arnquist, A. S.	St. Paul	Bigelow, C. E.	Dodge Center	Brunner, Julian M.	Rochester
Arouni, Khalil	St. Paul	Binet, H. E.	Grand Rapids	Brunsting, Louis A.	Rochester
Arvidson, C. G.	Minneapolis	Binger, H. E.	St. Paul	Buck, Fred H.	Shakopee
Arzt, C. P.	St. Paul	Binger, Melvin W.	Rochester	Buie, L. A.	Rochester
Athens, A. G.	Duluth	Birkeland, Ivar W.	Rochester	Bulkley, Kenneth	Minneapolis
Aune, Martin	Minneapolis	Birkland, O. N.	Hibbing	Bullen, F. W.	Hibbing
Aurand, W. H.	Minneapolis	Birnbarg, F. L.	St. Cloud	Bumpus, H. C.	Rochester
Aurelius, J. Richards	St. Paul	Bissell, F. S.	Minneapolis	Bumpus, Laurin D.	Rochester
Avery, J. Fowler	Minneapolis	Bjorgo, C. W.	Cannon Falls	Bunten, William A.	Rochester
Ayres, G. T.	Ely	Black, Wm	Mankato	Burch, F. E.	St. Paul
Babcock, F. M.	Northfield	Blacklock, S. S.	Hibbing	Burfiend, G. H.	St. Paul
Backe, Edmund	Kenyon	Blake, Jas.	Hopkins	Burnap, W. L.	Fergus Falls
Bacon, Donald K.	St. Paul	Blakey, A. R.	Osakis	Burns, F. W.	St. Paul
Bacon, Knox	St. Paul	Blakely, C. C.	Barnum	Burns, M. A.	Milan
Bacon, L. C.	St. Paul	Blanchard, H. G.	Fairmont	Burns, H. D.	Albert Lea
Badeaux, G. I.	Brainerd	Blautone, Henry H.	Minneapolis	Burns, R. M.	Two Harbors
Bagley, W. R.	Duluth	Blegen, H. M.	Warren	Burns, R. M.	St. Paul
Bailey, H. B.	Ceylon	Bliss, Theodore L.	Rochester	Bursheim, P. J.	Lake Benton
Bain, Charles Grant	Rochester	Block, Phoebe P.	Virginia	Busby, James I.	Rochester
Baken, Melvin P.	Minneapolis	Bock, R. A.	St. Paul	Burton, Carl G.	St. Paul
Baker, A. C.	Fergus Falls	Bockman, M. W. H.	Minneapolis	Busher, H.	St. Paul
Baker, Alfred T.	Minneapolis	Bodine, Marc W.	Rochester	Butler, John	Minneapolis
Baker, E. L.	Minneapolis	Boeck, William C.	Rochester	Button, A. J.	Greenbush
Baker, Harry R.	Hayfield	Boeckmann, Egil	St. Paul	Buttuff, C. R.	Freeborn
		Boehm, J. C.	St. Cloud	Butz, J. A.	Monterey
		Bofenkamp, F. W.	Luverne	Butzer, John A.	Mankato

Buzzelle, L. K. Minneapolis
Byrnes, W. J. Minneapolis

Cabot, George S. Minneapolis
Cabot, V. S. Minneapolis
Cady, L. H. Minneapolis
Caine, C. E. Morris
Caldwell, Jas. P. St. Paul
Caldwell, Kenneth S. St. Paul
Caley, G. R. Princeton
Calhoun, F. W. Albert Lea
Callahan, F. F. Pokegama
Callenstrom, G. W. Minneapolis
Cameron, J. A. St. Paul
Camp, John D. Rochester
Camp, W. E. Minneapolis
Campbell, J. E. South St. Paul
Campbell, L. M. Minneapolis
Campbell, Robert Minneapolis
Cannon, Harry St. Paul
Cantwell, W. F. International Falls
Cardle, Archibald E. Minneapolis
Carey, Jas. B. Minneapolis
Carlaw, C. M. Minneapolis
Carman, C. L. St. Paul
Carman, Paul I. St. Paul
Carmen, J. E. Detroit Lakes
Carmichael, H. T. Rochester
Caron, Robert Minneapolis
Carroll, Wm. C. St. Paul
Carstens, C. F. Hibbing
Carter, Fred G. St. Paul
Catlin, John J. Buffalo
Cavanor, F. T. Minneapolis
Cave, Harry A. Rochester
Caylor, Harold D. Rochester
Cervenka, Charles F. New Prague
Chadbourne, A. G. Heron Lake
Chamberlain, H. E. Minneapolis
Chambers, W. C. Blue Earth
Chapman, T. L. Duluth
Chatterton, C. C. St. Paul
Cheleen, S. J. Minneapolis
Cheney, E. L. Duluth
Cherry, Chas. H. Minneapolis
Chesley, A. J. Minneapolis
Christensen, C. R. Starbuck
Christensen, Eli E. Rochester
Christensen, E. P. Two Harbors
Christianson, H. W. Wykoff
Christiansen, A. St. Paul
Christie, G. R. Long Prairie
Christie, R. L. Long Prairie
Christison, J. T. St. Paul
Chumley, Charles L. Rochester
Cirkler, A. A. Minneapolis
Clark, H. B. St. Cloud
Clark, H. S. Minneapolis
Clark, T. C. Minneapolis
Clawson, Thomas A., Jr. Rochester
Clay, F. H. St. Charles
Claydon, Donald R. Red Wing
Claydon, L. E. Red Wing
Clement, J. B. Lester Prairie
Clement, T. G. Duluth
Clifford, F. F. West Concord
Coakley, Leo P. Rochester
Cobb, S. G. St. Paul
Cochrane, W. J. Lake City
Colby, Woodard St. Paul
Cole, H. B. Redwood Falls
Cole, Wallace H. St. Paul
Coleman, F. B. Austin
Coleman, Julian H. Rochester
Collie, H. G. St. Paul
Collins, A. N. Duluth
Collins, H. C. Duluth
Collins, J. S. Wabasha
Colvin, A. R. St. Paul
Combacker, L. C. Fergus Falls
Comfort, Mander W. Rochester
Comstock, A. E. St. Paul
Condit, W. H. Minneapolis
Conley, Alva A. Cannon Falls
Conner, H. M. Rochester
Conner, Wm. H. Minneapolis
Connor, C. E. St. Paul
Cook, Paul B. St. Paul
Cook, Henry W. Minneapolis
Cooke, Harry H. Rochester
Cooney, H. C. Princeton
Cooper, M. D. Winnebago City
Cooperman, H. O. Minneapolis
Corbeille, Catherine Rochester
Corbett, J. Frank Minneapolis
Corrigan, J. E. Spooner
Corse, C. A. Verndale
Cornica, A. D. Minneapolis
Cosgriff, J. A. Olivia
Cosgrove, J. H. Duluth
Cosman, E. O. Minneapolis
Counsellor, Virgil S. Rochester

Countryman, Roger S. St. Paul
Covell, W. W. St. Peter
Coventry, W. A. Duluth
Cowers, E. W. North St. Paul
Cowing, P. G. Evansville
Crafts, Leo M. Minneapolis
Craig, C. C. International Falls
Craig, Winchell McK. Rochester
Cranmer, Richard R. Minneapolis
Creighton, Ralph H. Minneapolis
Cremmer, M. H. Red Wing
Crenshaw, J. L. Rochester
Cress, E. E. Boyd
Cress, P. J. Ellsworth
Crewe, J. E. Rochester
Crichtfield, L. R. St. Paul
Cronwell, B. J. Austin
Crowe, E. R. Arlington
Crump, Geo. P. Minneapolis
Crume, J. W. St. Paul
Culver, Lucian G. Stillwater
Culligan, J. M. St. Paul
Culligan, Leo C. St. Paul
Curtin, John F. Minneapolis
Cutts, George Minneapolis

Dack, Lloyd G. St. Paul
Dady, Elmer E. Minneapolis
Dahl, Elmer O. Minneapolis
Dahl, G. A. Mankato
Dahl, John A. Minneapolis
Dahlstrom, A. W. Minneapolis
Daignault, Oscar Benson
Daniel, Donald H. Minneapolis
Daniel, Lewis M. Minneapolis
Daniels, Harry A. Rochester
Daniels, J. St. Paul
Danielson, K. A. Litchfield
Darling, J. B. St. Paul
Dart, Leslie O. Minneapolis
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, Austin C. Rochester
Davis, B. F. Duluth
Davis, F. U. Faribault
Davis, H. S. Duluth
Davis, Herbert St. Paul
Davis, I. Grant Rushford
Davis, John D. Rochester
Davis, Lloyd Thos. Wadena
Davis, Thayer C. Wadena
Davis, William St. Paul
Dawley, Walter A. Rochester
Dean, Arthur C. Crookston
Dean, Benjamin F. Rochester
DeBoer, Hermanus Edgerton
DeCarle, Donald W. Rochester
Decker, Walter J. Rochester
Dedolph, Karl St. Paul
Delmore, J. L. Roseau
Delude, S. Dassel
Dempsey, D. P. Kellogg
Denman, A. V. Mankato
Derauf, B. L. St. Paul
Desjardins, Arthur U. Rochester
Devereaux, T. J. Wayzata
Dewar, J. E. Minneapolis
Deziel, G. Minneapolis
Diehl, Harold S. Minneapolis
Diessner, H. D. Minneapolis
Dickson, Thos. H., Jr. St. Paul
Disen, C. F. Minneapolis
Ditmire, David C. Jasper
Dittmore, David C. Rochester
Dittman, Geo. C. St. Paul
Dixon, Claude F. Rochester
Dixon, Robert K. Rochester
Dodge, F. A. LeSueur
Dohm, A. J. St. Paul
Dolan, C. E. Worthington
Dolder, F. C. Eyota
Doms, H. C. Slavton
Donohue, Philip F. St. Paul
Doolittle, L. E. Duluth
Donaldson, C. A. Chandler, Ariz.
Dordal, J. Sacred Heart
Dorge, Richard I. Minneapolis
Dornblaser, H. Bright Minneapolis
Down, Howard I. Rochester
Downs, W. J. Kerkhoven
Doxley, G. L. Minneapolis
Doyle, J. B. Rochester
Drake, Carl B. St. Paul
Drake, C. R. Minneapolis
Drake, F. A. Lanesboro
Dredge, H. P. Sandstone
Dreisbach, N. Minneapolis
Drenning, F. C. Duluth
Drips, D. G. Rochester
Drought, W. W. Fergus Falls
Dubbe, F. H. New Ulm
DuBois, J. A. Sauk Center

DuBois, J. F. Sauk Center
Dudley, J. H. Windom
Duff, Edwin R. Minneapolis
Duncan, Henry Marietta
Dungay, Neil S. Northfield
Dunlap, E. H. Minneapolis
Dunlap, H. F. Rochester
Dunlop, Alex. Crookston
Dunn, Geo. R. Minneapolis
Dunn, J. N. St. Paul
Dunne, Gerald P. St. Paul
Dunsmoor, F. A. Minneapolis
Durgin, F. L. Winnebago
Dutton, C. E. Minneapolis
Dworsky, Samuel D. Minneapolis

Earl, George A. St. Paul
Earl, Robert O. St. Paul
Eberlin, E. A. Glenwood
Eby, C. B. Spring Valley
Eckman, P. F. Duluth
Eckstein, A. W. Comfrey
Edlund, G. St. Paul
Edstrom, Henry Crookston
Edwards, Ralph T. Elysian
Egilsrud, Kristian Minneapolis
Ehrenberg, C. J. Minneapolis
Eich, Matthew Minneapolis
Eisenman, W. A. Chisholm
Eitel, Geo. D. Minneapolis
Ekblad, J. W. Duluth
Eklund, E. J. Norwood
Eklund, Wm. J. Duluth
Elias, F. J. Duluth
Ellingson, A. R. Detroit Lakes
Ellison, Frank E. Monticello
Ellison, David E. Minneapolis
Eley, J. R. Glenwood
Ely, O. S. South St. Paul
Emerson, E. C. St. Paul
Engberg, E. J. St. Paul
Engelhart, P. C. Minneapolis
Engstrand, Oscar J. Warren
Eppard, R. M. Cloquet
Erb, F. A. Minneapolis
Erdmann, C. A. Minneapolis
Ericson, J. A. Minneapolis
Ericson, Swan LeSueur
Ericksen, L. G. Wood Lake
Erickson, J. L. Twin Valley
Ernest, G. C. St. Paul
Ertel, E. O. Ellendale
Eshelby, E. C. St. Paul
Esser, John P. Farham
Estrem, C. O. Fergus Falls
Estrem, T. A. Hibbing
Eubanks, George F. Rochester
Eusterman, G. B. Rochester
Evans, Edward T. Minneapolis
Evars, Arrah B. Rochester
Everlof, J. L. Minneapolis
Ewens, H. B. Virginia
Ewing, C. F. Wheaton

Fahey, E. W. St. Paul
Fallon, John M. Rochester
Fansler, W. A. Minneapolis
Farabaugh, Charles L. Minneapolis
Farrish, R. C. Sherburn
Faust, Louis S. Rochester
Fauster, John U., Jr. Rochester
Fauth, Karl J. Gaylord
Fawcett, A. Maxwell Granite Falls
Fawcett, C. E. Stewartville
Farr, R. E. Minneapolis
Feeney, John M. Minneapolis
Fehlend, Harold R. Rochester
Fenger, E. Oak Terrace
Ferguson, J. C. St. Paul
Ferreira, Gideon J. Duluth
Fessler, Harold H. St. Paul
Figi, F. A. Rochester
Fiksdal, M. J. Willmar
Fink, Walter H. Minneapolis
Finney, W. P., Jr. Rochester
Fisch, Herbert M. Austin
Fischer, G. Minneapolis
Fischer, H. P. Shakopee
Fischer, Mario McC. Duluth
Fischer, P. M. Shakopee
Fjeldstad, C. Alford Minneapolis
Flagstad, A. E. St. Paul
Fleischhauer, D. S. Wabasha
Fleming, A. S. Minneapolis
Fleming, James Cloquet
Fleming, T. N. St. Cloud
Flinn, B. F. Redwood Falls
Flinn, T. E. Redwood Falls
Flocken, Chas. F. Pasadena, Calif.
Flom, A. O. Chicago City
Flower, W. Z. Minneapolis

Fogarty, Chas. W.	St. Paul	Grant, H. W.	St. Paul	Hayes, M. F.	Nashauk
Foley, F. E. B.	St. Paul	Gratzek, Thos.	St. Paul	Haynes, A. L.	Faribault
Folken, F. G.	Albert Lea	Grave, Floyd	Minneapolis	Haynes, B. H.	St. James
Forbes, Robert S.	Duluth	Graves, W. N.	Duluth	Head, C. D.	Minneapolis
Ford, Burton C.	Marshall	Grawn, F. A.	Duluth	Healy, R. T.	Pier
Ford, Frances A.	Rochester	Gray, F. D.	Marshall	Hearn, Wm. O.	Minneapolis
Forrest, C. G.	Clearbrook	Greeley, L. Q.	Duluth	Heath, A. C.	St. Paul
Fortin, Harry J.	Rochester	Green, E. K.	Minneapolis	Hebeisen, M. B.	Carver
Fortney, G. O.	Zumbrota	Greene, Carl H.	Rochester	Heck, Frank Joseph	Rochester
Foshager, Henry T.	Clara City	Greene, Chas. L.*	St. Paul	Heck, Wm. W.	St. Paul
Foster, Wilmont C.	Rochester	Greene, W. P.	Minneapolis	Hedback, A. E.	Minneapolis
Fowler, Louis McCargo	Rochester	Greenlee, Daniel P.	Rochester	Hedenstrom, F. G.	St. Paul
Fowler, L. H.	Minneapolis	Greishemer, Esther M.	Minneapolis	Hefke, Hans W.	Rochester
Fox, Ben.	Rochester	Griffin, P. J.	Fertile	Hegge, O. H.	Austin
Franchere, F. W.	Lake Crystal	Grier, James P.	Rochester	Heiberg, E. A.	Fergus Falls
Francis, David W.	Morristown	Grimes, H. B.	Madelia	Heimark, J. H.	Moorhead
Fredericks, George M.	Minneapolis	Grinnell, W. B.	Preston	Heimark, J. J.	Blue Earth
Frederickson, Alice C.	Lake Lillian	Grise, W. B.	Austin	Heimark, O. E.	Duluth
Frederickson, C. H.	Rochester	Grogan, J. S.	Wadena	Heimdal, Clarence O.	Rochester
Frederickson, Guy U. Y.	Lake Lillian	Groschupf, Theo. P.	Bemidji	Heise, W. F. C.	Winona
Frederborn, J. R.	Fergus Falls	Grose, Fredk. N.	Clarissa	Helk, H. H.	Minneapolis
Freed, O. J. R.	Cokato	Ground, H. T.	Virginia	Helland, G. M.	Spring Grove
Freeman, C. D.	St. Paul	Gruenhagen, Arnold P.	Virginia	Helland, J. W.	Spring Grove
Freeman, Geo. H.	St. Peter	Gullixson, A.	Albert Lea	Helmholz, H. F.	Rochester
Freeman, W. L.	St. Cloud	Gunderson, Nels A.	Minneapolis	Hempstead, B. E.	Rochester
Freeman, J. P.	Albert Lea	Gunderson, R. M.	Lake Park	Hemstead, Werner	St. Cloud
Freligh, W. P.	Albert Lea			Hench, Philip S.	Rochester
French, H. S.	Duluth	Habein, Harold C.	Rochester	Henderson, A. J.	Kiester
Freymler, E. F.	Markville	Haberman, E.	Osakis	Henderson, M. S.	Rochester
Friedell, A.	Minneapolis	Hacking, Frank H.	Minneapolis	Hendrickson, J. F.	Minneapolis
Fricke, Robert E.	Rochester	Haddow, N. W.	Minneapolis	Hengstler, W. H.	St. Paul
Friesleben, Wm.	Sauk Rapids	Haessley, S. B.	Faribault	Henney, Wm. H.	McIntosh
Fritzsche, Albert	New Ulm	Hagaman, Geo. K.	St. Paul	Henriksen, H. G.	Elko
Fritzsche, L. A.	New Ulm	Hagen, G. L.	Minneapolis	Henry, C. E.	Minneapolis
Froats, C. W.	Eveleth	Hagen, H. O.	New Richland	Henry, Myron O.	Minneapolis
Froelich, H. W.	Thief River Falls	Hagen, O. E.	Butterfield	Hensel, C. N.	St. Paul
Frost, E. H.	Willmar	Hagen, Olaf J.	Moorhead	Henslin, A. E.	LeRoy
Frost, Harry T.	Wadena	Haggard, G. D.	Minneapolis	Herbolzheimer, A. J.	Minneapolis
Frost, Russell H.	Wabasha	Haines, J. H.	Stillwater	Herbst, Wm. P.	Minneapolis
Fugina, George R.	Mankato	Haines, S. F.	Rochester	Herman, Arthur L.	Minneapolis
Fulcher, Oscar H.	Rochester	Haldeman, Keene O.	Rochester	Hermanson, Peter E.	Ivanhoe
Fulton, J. F.	St. Paul	Halenbeck, Philip L.	St. Cloud	Herrmann, Edgar T.	St. Paul
Funk, Victor K.	Oak Terrace	Hall, A. R.	St. Paul	Herrmann, S. F.	Rochester
		Hall, E. L.	Princeton	Hertel, G. E.	Austin
Gaarde, F. W.	Rochester	Hall, Henry H.	St. Paul	Hesselgrave, S. S.	St. Paul
Gager, E. C.	St. Paul	Hall, J. M.	Minneapolis	Heyerdale, O. C.	Rochester
Gaines, E. C.	Buffalo Lake	Hall, S. S.	Minneapolis	Hieber, J. F.	Minneapolis
Gaslaas, A. F.	Wadena	Hallberg, C. A.	Minneapolis	Hielscher, J. A.	Mankato
Gallagher, B. J.	Waseca	Hallenbeck, D. F.	Rochester	Higbee, Paul A.	Minneapolis
Gamble, J. W.	Albert Lea	Halloran, Walter	Jackson	Higgins, J. H.	Minneapolis
Gamble, P. M.	Albert Lea	Halper, Philip	St. Paul	Hilger, J. M.	Iona
Gamble, R. M.	Albert Lea	Hamel, Arnold L.	Minneapolis	Hilger, A. W.	St. Paul
Gammell, J. H.	Minneapolis	Hamilton, A. S.	Minneapolis	Hilger, D. D.	St. Paul
Garand, J. H.	Dayton	Hamlin, George B.	Minneapolis	Hilger, L. A.	St. Paul
Garbrecht, Arthur	St. Paul	Hammermeister, T. F.	New Ulm	Hill, Eleanor J.	Minneapolis
Gardiner, D. G.	St. Paul	Hammes, E. M.	St. Paul	Hill, Frederick Charles	Rochester
Gardner, Edwin L.	Minneapolis	Hammond, A. J.	Minneapolis	Hill, Frederick E.	Duluth
Gardner, V. H.	Fairmont	Hammond J. F.	St. Paul	Hilton, J. M.	Brownville
Gault, C. C.	Owatonna	Hamrick, Robert A.	Rochester	Hiniker, Louis P.	St. Paul
Geer, Everett K.	St. Paul	Hand, John R.	Rochester	Hirschfelder, A. D.	Minneapolis
Gehlen, J. N.	St. Paul	Hand, W. R.	Elbow Lake	Hirschfeld, M. S.	Duluth
Geist, Emil S.	Minneapolis	Hane, Richard L.	Rochester	Hirschboeck, F. J.	Duluth
Geist, George A.	St. Paul	Haney, C. L.	Duluth	Hirschfeld, F. R.	Minneapolis
Geitz, J. J.	St. Cloud	Hanlon, Frank R.	Rochester	Hitchings, W. S.	Lakefield
Gerber, Milo P.	Brainerd	Hannah, Hewitt B.	Minneapolis	Hoglund, A. W.	Minneapolis
Germo, Chas.	Balaton	Hansen, Erling	Minneapolis	Hobbs, C. A.	Minneapolis
Ghent, C. Harry	St. Paul	Hansen, M.	Ada	Hochlizer, J. J.	St. Paul
Ghent, M. M.	St. Paul	Hansen, Olga S.	Minneapolis	Hodapp, R. J.	Willmar
Gibbons, Francis C.	Comfrey	Hanson, A. M.	Faribault	Hodge, S. V.	Minneapolis
Gibbon, L. L.	Lowry	Hanson, H. J.	Minneapolis	Hodgson, H. H.	Crookston
Giere, E. O.	Minneapolis	Hanson, H. V.	St. Paul	Hoff, Alfred	St. Paul
Giere, J. C.	Minneapolis	Hanson, William A.	Minneapolis	Hoffman, Max H.	St. Paul
Giere, Richard W.	Minneapolis	Harmon, G. E.	St. Paul	Hoidale, A. D.	Tracy
Giere, S. W.	Benson	Hare, E. R.	Minneapolis	Holbrook, J. S.	Mankato
Giesen, A. F.	Starbuck	Harriman, L.	Howard Lake	Holcomb, J. T.	St. Paul
Giessler, Paul W.	Minneapolis	Harrington, C. D.	Minneapolis	Holcomb, O. W.	St. Paul
Giffin, H. Z.	Rochester	Harrington, F. E.	Minneapolis	Holland, A. S.	Minneapolis
Gillfillan, J. S.	St. Paul	Harrington, S. W.	Rochester	Holen, T.	Minneapolis
Gillespie, M. G.	Duluth	Harris, C. N.	Chisholm	Holl, P. M.	Minneapolis
Gillespie, N. H.	Duluth	Hart, Alfred B., Jr.	Owatonna	Holland, Wilbur Wallace	Rochester
Gingold, Benj. A.	Minneapolis	Hart, William E.	Minneapolis	Hollands, W. H.	Fisher
Ginsberg, Wm.	St. Paul	Hartel, Wm. F.	St. Paul	Holm, C. E.	St. Paul
Gleason, Ntery A.	Rochester	Hartley, E. C. Jr.	St. Paul	Holm, Geo. A.	Minneapolis
Goblirsch, A. P.	Sleepy Eye	Hartman, Howard R.	Rochester	Holm, H. H.	Glencoe
Goeckerman, W. H.	Rochester	Hartwell, Shattuck W.	Rochester	Holm, P. F.	Wells
Goehrs, H. W.	St. Cloud	Hartzell, John B.	Rochester	Holman, C. J.	Mankato
Goforth, Clifford	St. Peter	Hartzell, Thos. B.	Minneapolis	Holmberg, L. J.	Canby
Goldberg, Isadore M.	Minneapolis	Haskell, A. D.	Alexandria	Holmes, A. E.	Rush City
Golden, C. M.	Tyler	Haskins, John L.	King's Park, N. Y.	Holmes, W. B.	Ada
Goltz, E. V.	St. Paul	Hassett, Roger G.	Mankato	Holst, C. F.	Little Falls
Good, Louis P.	Rochester	Hasting, D. R.	Minneapolis	Holst, J. B.	Little Falls
Good, Ralph W.	Rochester	Hatch, W. E.	Duluth	Holt, John E.	St. Paul
Gorder, Arne C.	Rochester	Hathaway, I. C.	Minneapolis	Holt, Wm. B.	Minneapolis
Gordon, Geo. J.	Minneapolis	Hathaway, S. J.	Proctor	Holtan, Theodore	Waterville
Gosin, D. F.	Minneapolis	Hauge, M. M.	Clarkfield	Holte, H.	Crookston
Gosslee, G. L.	Moorhead	Hauser, V. P.	St. Paul	Horton, Bayard T.	Rochester
Gowan, L. R.	Duluth	Havens, Fred Z.	Rochester	Houkom, Bjarne	Fergus Falls
Graham, A. Stephens	Rochester	Havens, John G. W.	Austin	House, Z. E.	Cass Lake
Graham, David	Duluth	Haverfield, Addie R.	Minneapolis	Hovde, H.	Duluth
Graham, R. D.	Duluth	Hawkins, V. J.	St. Paul	Hovde, Roll	Winthrop
Graham, Robert	Duluth	Hawkinson, J. F.	Brainerd	Howard, M. I.	Mankato
		Hawkinson, John P.	Crosby	Howard, W. S.	St. Paul
		Hayes, J. M.	Minneapolis	Huenekens, E. J.	Minneapolis

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 Hultkrans, Homer W. Rochester
 Humiston, E. W. Moorhead
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 Hunt, F. N. Fairmont
 Hunt, H. E. St. Paul
 Hunt, Henry Franklin. Rochester
 Hunt, R. C. Fairmont
 Hunt, R. C. Rochester
 Hunte, A. F. Truman
 Hurt, Algernon Smith, Jr. Rochester
 Huseby, H. W. Cloquet
 Hutchinson, Charles J. Minneapolis
 Huxley, Frederick E. Faribault
 Hynes, Charles. Minneapolis
 Hynes, James. Minneapolis
 Hynes, John E. Minneapolis
 Ide, A. W. St. Paul
 Ikeda, Kano. St. Paul
 Irvine, H. G. Minneapolis
 Irwin, Alex F. Minneapolis
 Jackson, C. M. Minneapolis
 Jacobs, A. C. Elmore
 Jacobs, Jno. C. Willmar
 Jacobs, Minerd F. Rochester
 Jacobson, Clarence. Chisholm
 Jacobson, David J. Blackduck
 Jacquot, G. L. Marshall
 James, J. H. Mankato
 Jamieson, Earl. Walnut Grove
 Jennings, Frank L. Oak Terrace
 Jennings, Mary H. Minneapolis
 Jensen, A. H. Hutchinson
 Jensen, Harry. Minneapolis
 Jensen, M. J. Minneapolis
 Jensen, T. J. Duluth
 Johnson, A. E. Red Wing
 Johnson, A. E. Minneapolis
 Johnson, A. E. Minneapolis
 Johnson, Asa M. St. Paul
 Johnson, C. E. St. Paul
 Johnson, C. M. Dawson
 Johnson, Ellsworth. Windom
 Johnson, E. W. Bemidji
 Johnson, H. P. Fairmont
 Johnson, Hartland C. St. Paul
 Johnson, Hans. Kerkhoven
 Johnson, H. M. Dawson
 Johnson, James A. Minneapolis
 Johnson, Julius. Minneapolis
 Johnson, Nimrod A. Minneapolis
 Johnson, Norman. Minneapolis
 Johnson, O. V. Sebeka
 Johnson, R. A. Minneapolis
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 Johnson, Selmer M. Minneapolis
 Johnson, T. H. Minneapolis
 Johnson, Walter R. Sauk Center
 Jones, A. W. Red Wing
 Jones, D. C. St. Paul
 Jones, E. M. St. Paul
 Jones, G. M. Minneapolis
 Jones, H. T. Rochester
 Jones, H. W. Minneapolis
 Jones, Richard N. St. Cloud
 Jones, Robert Du Vae. Rochester
 Jones, W. A. Minneapolis
 Jones, William R. Minneapolis
 Jordan, Ferdinand M. Rochester
 Joseph, Alexander. Minneapolis
 Joseph, R. J. Stillwater
 Joyce, George Leo. Stewartville
 Joyce, G. T. Rochester
 Judd, E. S. Rochester
 Judge, Walter T. Graceville
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 Juliar, R. O. St. Clair
 Just, Herman J. Lafayette
 Kaasa, L. J. Albert Lea
 Kadesky, David. St. Paul
 Kahala, Arthur. Crookston
 Kalinoff, D. Stillwater
 Kamman, Gordon R. St. Paul
 Kamp, B. A. Albert Lea
 Kannary, E. L. St. Paul
 Kanne, C. W. Faribault
 Karn, B. R. Ortonville
 Kaufman, A. J. Franklin
 Kaufman, Wm. C. Appleton
 Kean, N. D. Coleraine
 Keith, N. M. Rochester
 Kelling, Louis F. Lakefield
 Kelly, John V. St. Paul
 Kelly, Paul H. St. Paul

Kelsey, C. G. Hinckley
 Kemp, A. F. Mankato
 Kemp, M. W. Fergus Falls
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 Kennedy, Jane F. Minneapolis
 Kennedy, Roger L. J. Rochester
 Kennedy, R. Roy. Minneapolis
 Kennedy, W. A. St. Paul
 Kenyon, Paul. Wadena
 Kepler, Edwin J. Rochester
 Kerlan, M. Bemidji
 Kerlan, S. Z. Aitkin
 Kern, M. J. St. Cloud
 Kernkamp, Leila. Minneapolis
 Kernohan, James W. Rochester
 Kerschbaumer, Louisa. St. Paul
 Kertesz, Herman. Arlington
 Keyes, C. R. Duluth
 Keyes, E. D. Winona
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 Kiefer, M. A. Sleepy Eye
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 Kiesling, I. H. Nashauk
 Kilbourne, A. F. Rochester
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 King, E. A. Canby
 King, George L. Minneapolis
 King, Harry T. St. Paul
 King, W. R. Minneapolis
 King, W. S. Eveleth
 King, Z. P. St. Paul
 Kingsbury, E. M. Clearwater
 Kinsella, Thomas J. Oak Terrace
 Kirk, G. P. East Grand Forks
 Kistler, A. J. Minneapolis
 Kistler, A. S. St. Paul
 Kistler, C. M. Minneapolis
 Kittelson, T. N. Fergus Falls
 Klavness, E. J. Monticello
 Klein, Harry. Duluth
 Klein, H. N. St. Paul
 Klima, W. W. Stewart
 Kliman, F. E. Duluth
 Knapp, F. N. Duluth
 Knauff, M. K. St. Paul
 Knight, Ralph T. Minneapolis
 Knight, Ray R. Minneapolis
 Koch, John C. Minneapolis
 Koenigsberger, Chas. Mankato
 Kohlry, C. O. Duluth
 Kohler, D. W. St. Joseph
 Kolars, J. J. Le Sueur Center
 Koller, Herman M. Minneapolis
 Koller, L. R. Minneapolis
 Kolset, Carl D. Sanborn
 Koop, Herman E. Cold Springs
 Koop, S. H. Richmond
 Kookier, Herman J. Duluth
 Kraft, Peter. Duluth
 Kremer, Walter J. Minneapolis
 Kriedt, Daniel. Minneapolis
 Kucera, Frank Jos. Hopkins
 Kucera, Wm. J. Minneapolis
 Kuhlman, August. Melrose
 Kusske, A. L. New Ulm
 Kuth, J. R. Duluth
 Kvitrud, G. St. Paul
 Lacy, Nicholas E. Rochester
 Laird, A. T. Nopeming
 Lajoie, John M. Minneapolis
 Langenderfer, F. V. St. Paul
 Langhoff, A. H. Glencoe
 Laney, R. L. Puposky
 Lannin, J. C. Mabel
 Lapiere, A. P. Minneapolis
 Lapiere, C. A. Minneapolis
 Lapiere, J. T. Minneapolis
 Larsen, C. L. St. Paul
 Larsen, O. O. Detroit Lakes
 Larson, Clarence M. Minneapolis
 Larson, A. L. Philadelphia, Pa.
 Larson, Lawrence M. Rochester
 Larson, L. M. St. Paul
 Laughlin, J. T. Grey Eagle
 Laurent, A. A. Minneapolis
 LaVake, R. T. Minneapolis
 Lax, Morris H. St. Paul
 Lazar, H. L. Minneapolis
 Leahy, Bartholomew. St. Paul
 Leavenworth, R. O. St. Paul
 Leavitt, H. H. Minneapolis
 Lebowski, Joseph A. Minneapolis
 Leck, Clifford C. Austin
 LeClerc, J. E. Le Sueur
 Leddy, Eugene T. Rochester
 Lee, H. M. Minneapolis

Lee, J. L. Watertown
 Lee, W. A. Fergus Falls
 Lee, Walter N. Madison
 Leebens, J. H. Lismore
 Leibold, H. H. Parkers Prairie
 Leitch, Archibald. St. Paul
 Leitch, N. M. Warrroad
 Leland, Harold R. Minneapolis
 Leland, John T. Herman
 Leland, M. N. Minneapolis
 Lemon, W. S. Rochester
 Lemstrom, Jarl. Minneapolis
 Lenander, Melvin E. St. Peter
 Lenont, C. B. Virginia
 Leonard, L. J. Minneapolis
 Leonard, Gilbert J. St. Paul
 Lepak, F. J. Duluth
 Lepak, John A. St. Paul
 Leopold, B. A. Bywood, Pa.
 Lerch, William. Cable, Wis.
 Leuty, Amos. Morris
 Lewis, A. J. Henning
 Lewis, C. B. St. Cloud
 Lewis, Charles F. Austin
 Lewis, W. W. St. Paul
 Lexa, F. J. Lonsdale
 Libert, John N. St. Cloud
 Lichtenstein, H. Winona
 Lick, C. Louis. St. Paul
 Liedloff, A. G. Mankato
 Lillie, H. I. Rochester
 Lillie, W. I. Rochester
 Lima, Ludvig. Montevideo
 Lind, C. J. Minneapolis
 Lindberg, A. L. Wheaton
 Linde, Herman. Cyrus
 Lindquist, R. H. Minneapolis
 Lindsay, W. V. Winona
 Linner, H. P. Minneapolis
 Linton, W. B. Minneapolis
 List, Walter E. Minneapolis
 Litchfield, John T. Minneapolis
 Litman, Samuel N. Duluth
 Little, N. J. St. Paul
 Litzenberg, J. C. Minneapolis
 Lloyd, H. J. Mankato
 Locken, O. E. Crookston
 Lodmell, Elmer A. Wadena
 Logan, A. F. Rochester
 Logan, F. W. Blue Earth
 Logefield, Rudolph C. Minneapolis
 Lommen, A. P. Lanesboro
 Lommen, P. A. Austin
 Loofbourrow, Elias H. Keewatin
 Long, Jesse. Minneapolis
 Loomis, E. A. Minneapolis
 Loughery, Harold B. Rochester
 Love, Fred A. Carlos
 Lowe, Earl R. So. St. Paul
 Lowe, Thomas A. So. St. Paul
 Lowe, Thos. Pipestone
 Luedtke, G. H. Rochester
 Lum, C. E. Fairmont
 Lund, Arthur E. Duluth
 Lundgren, A. C. Minneapolis
 Lundholm, A. M. St. Paul
 Lundquist, E. F. Minneapolis
 Lundy, John S. Rochester
 Lynch, M. J. Minneapolis
 Lyng, John A. Minneapolis
 Lyon, E. P. Minneapolis
 Lysne, Henry. Minneapolis
 McBeath, Ewing C. N. Y. City
 McBride, William P. Rochester
 McBroom, D. E. Cambridge
 McCann, James C. Rochester
 McCarthy, Donald. Minneapolis
 McCarthy, W. T. Mabel
 McCarthy, W. R. St. Paul
 McCartney, James S. Minneapolis
 McCarty, P. D. Ely
 McCarty, Ray B. Rochester
 McClanahan, J. H. White Bear
 McClanahan, T. S. White Bear
 McCloud, C. N. St. Paul
 McComb, C. F. Duluth
 McCoy, Mary. Duluth
 McCrea, James. Fulda
 McCuskey, Chas. F. Rochester
 McDaniel, Orianna. Minneapolis
 McDaniel, S. P. Mountain Iron
 McDonald, A. L. Duluth
 McDowell, C. H. Winona
 McDowell, J. P. St. Cloud
 McEachran, A. Minneapolis
 McFarland, A. H. Minneapolis
 McGandy, R. F. Minneapolis
 McGeary, Geo. E. Minneapolis
 McGiffert, E. N. Duluth
 McGroarty, J. J. Easton

McGuigan, H. T. Red Wing
McHafie, O. L. Duluth
McHugh, Roderick F. Aitkin
McIntire, H. M. Waseca
McIntyre, E. H. Virginia
McIntyre, John A. Owatonna
McKaig, Carl B. Pine Island
McKechnie, Wilfred St. Peter
McKenna, J. K. Austin
McKeon, J. O. Montgomery
McKeon, James St. Paul
McKeon, Owen St. Paul
McKeown, E. G. Pipestone
McKibben, H. E. St. Cloud
McKinlay, C. A. Minneapolis
McKinley, J. C. Minneapolis
McKinney, F. S. Minneapolis
McKinnon, J. J. Wadena
McLaren, Jeanette M. St. Paul
McLaughlin, E. M. Winona
McNevin, C. F. St. Paul
McNutt, John R. Barnum
McKibby, Fred Hibbing
McQuiggin, Mark R. Rochester
McPheeters, H. O. Minneapolis
McVicar, Chas. S. Rochester
Macbeth, J. L. St. Clair
MacDonald, A. E. Minneapolis
MacDonald, D. A. Minneapolis
MacDonald, Irving C. Minneapolis
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MacRae, Gordon C. Duluth
Mach, Frank B. Minneapolis
Maertz, W. F. New Prague
Magath, T. B. Rochester
Magee, Henry R. Rochester
Magie, W. H. Duluth
Magner, Estelle A. Minneapolis
Magney, F. H. Duluth
Mahorner, Howard R. Rochester
Mahowald, A. Albany
Maland, C. O. Minneapolis
Malmgren, George E. Rochester
Manley, James R. Duluth
Mann, A. T. Minneapolis
Manson, F. M. Worthington
Marbley, W. J. Minneapolis
Marcum, E. H. Bemidji
Margolis, Harry M. Rochester
Marrlette, Ernest Oak Terrace
Mark, D. B. Minneapolis
Marken, M. H. Fairmont
Marshall, James M. Rochester
Martin, Edw. T. Duluth
Martin, W. C. Duluth
Martineau, J. L. St. Paul
Martinson, C. J. Wayzata
Masson, D. M. Rochester
Masson, J. C. Rochester
Matchan, Glen R. Minneapolis
Matthews, Justus Minneapolis
Mattill, B. M. Oak Terrace
Mattson, Hamline Rochester
Mattson, P. A. Winona
Maxeiner, Stanley R. Minneapolis
May, James Alan Rochester
May, W. H. Minneapolis
Mayland, M. L. Faribault
Mayne, Roy M. Duluth
Mayo, C. H. Rochester
Mayo, Charles W. Rochester
Mayo, Joseph G. Rochester
Mayo, W. J. Rochester
Maytum, Charles K. Rochester
Mead, Marion A. Minneapolis
Meckstroth, C. W. Brandon
Mee, P. H. Osseo
Meighen, J. W. Ulen
Meierding, Wm. A. New Ulm
Meilicke, W. A. Nicollet
Meinert, A. E. Winona
Meland, Ernest L. Dalton
Melby, Benedik Blooming Prairie
Melby, O. F. Thief River Falls
Melson, G. R. Lytle
Mercil, William F. Crookston
Merkert, Charles E. Minneapolis
Merkert, G. L. Minneapolis
Merriman, L. L. Duluth
Mesker, G. H. Olivia
Meyer, A. A. Melrose
Metheny, David Rochester
Meyer, E. L. Minneapolis
Meyer, F. F. Faribault
Meyering, E. A. St. Paul
Meyering, H. C. W. Rochester
Michael, J. C. Minneapolis
Michelson, H. E. Minneapolis
Miller, Charles D. Rochester
Miller, H. A. Fairmont
Miller, V. I. Mankato
Miller, W. A. New York Mills
Mills, J. L. Winnebago

Mills, Ralph G. Rochester
Mingo, F. E. Hugo
Mitchell, A. B. Hector
Mitchell, Frederick St. Paul
Mitchell, R. S. Grand Meadow
Moe, Russel J. Duluth
Moe, Thomas Moose Lake
Moffatt, A. G. Howard Lake
Mogliner, S. N. St. Paul
Moench, Mary St. Paul
Moersch, F. P. Rochester
Moersch, H. J. Rochester
Mohardt, John H. Rochester
Moir, Wm. W. Minneapolis
Molander, H. A. St. Paul
Monahan, R. H. Minneapolis
Monroe, P. B. Two Harbors
Montgomery, Hamilton Rochester
Moore, A. B. Rochester
Moore, Thomas B. Rochester
Moorhead, M. B. Minneapolis
Moquin, Marie A. St. Paul
More, C. W. Eveleth
Moren, Edwin Minneapolis
Moriarty, Cecile R. Minneapolis
Mork, B. O. Worthington
Morley, G. A. Crookston
Morrison, A. W. Minneapolis
Morrisey, F. B. St. Paul
Morrow, James J. Austin
Morse, M. P. LeRoy
Morsman, L. W. Hibbing
Moras, C. R. Zumbrota
Mortenson, N. G. Duluth
Morton, Herschel B. Rochester
Moses, Joseph Jr. Northfield
Moss, Myer N. St. Paul
Moynihan, A. F. Sauk Center
Moynihan, T. J. St. Paul
Moyer, Ralph E. Bemidji
Mroz, Rudolph J. Rochester
Muir, E. C. Minneka
Mulholland, Stanford W. Rochester
Muller, R. H. St. Paul
Murdoch, J. M. Faribault
Murphy, George T. Rochester
Murphy, Ignatius J. Minneapolis
Murphy, Leo Minneapolis
Murray, D. D. Duluth
Murray, James K. P. Rochester
Mussery, R. D. Rochester
Myers, J. A. Minneapolis
Myers, Thos. St. Paul
Myre, C. R. Paynesville

Naegli, Frank Fergus Falls
Nagel, H. D. Waconia
Nass, H. A. Mabel
Nathanson, M. H. Minneapolis
Nauth, W. W. Winona
Neher, F. H. St. Paul
Nelson, C. P. Minneapolis
Nelson, E. H. Chisholm
Nelson, Ernest J. Owatonna
Nelson, H. E. Crookston
Nelson, H. S. Minneapolis
Nelson, L. A. St. Paul
Nelson, M. S. Granite Falls
Nelson, Nesmith Brainerd
Nelson, O. E. Minneapolis
Nelson, O. N. Battle Lake
Nelson, R. L. Duluth
Nelson, Wallace I. Underwood
Nelson, Wallace L. Rochester
Nesbit, Harold T. St. Paul
Nesbit, Mark E. Rochester
Neseth, O. S. Kenyon
Neumann, C. A. Lewiston
New, G. B. Rochester
Newhart, Horace Minneapolis
Nicholson, M. A. Duluth
Nickel, Allen A. C. Rochester
Nippert, H. T. St. Paul
Nippert, L. A. Minneapolis
Nolan, Lewis E. Vernon Center
Norton, A. N. Minneapolis
Nordin, C. G. St. Paul
Nordin, G. T. Minneapolis
Nordland, Martin Minneapolis
Norman, J. F. Crookston
Norment, William B. Rochester
Norris, Edgar H. St. Paul
Norris, G. H. Annandale
Northey, T. M. Rockford
Norton, Manville W. Rochester
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Noth, H. W. Minneapolis
Nunn, Leslie L. Rochester
Nusbaum, D. H. Jackson
Nutting, Roland E. Rochester
Nye, Katherine A. St. Paul
Nye, Lillian L. St. Paul

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O'Brien, William A. Minneapolis
O'Connor, D. C. Eden Valley
O'Connor, I. A. St. Paul
O'Connor, J. P. St. Paul
O'Connor, Patrick H. Amboy
O'Donnell, D. M. Ortonville
O'Donnell, J. E. Minneapolis
O'Hara, J. J. Jamesville
O'Leary, P. A. Rochester
Ober, C. M. Minneapolis
Ochsner, Harold C. Rochester
Oerting, Harry St. Paul
Offutt, Susan R. Rochester
Ogden, Warner St. Paul
Ohage, Justus St. Paul
Ohage, Justus St. Paul
Ohlinger, L. B. Chicago, Ill.
Ohnstad, J. L. McIntosh
Oliver, C. I. Graceville
Olson, Albert E. Duluth
Olson, Chas. A. St. Paul
Olson, Chester J. Belle Plaine
Olson, Ernest A. Pine Island
Olson, F. M. Minneapolis
Olson, G. M. Minneapolis
Olson, Olaf A. Minneapolis
Olson, R. G. Minneapolis
Olson, W. P. Gaylord
Onsgard, C. K. Halstad
Onsgard, L. K. Houston
Oppegard, C. L. Crookston
Oppegard, M. O. Crookston
Oredson, O. A. Duluth
Orlob, W. M. Renville
Ortman, John W. Pierz
Osburn, Burt F. International Falls
Osborn, Lida Mankato
Ostergren, E. W. St. Paul
Otto, H. C. Frazee
Ovrend, K. V. Hallock
Owre, Oscar Minneapolis

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Palmer, B. M. Rochester
Palmer, C. F. Albert Lea
Palmer, R. N. Lanesboro
Palmer, W. L. Albert Lea
Parker, H. L. Rochester
Parker, O. W. Ely
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Parson, Geo. W. Rochester
Parson, L. R. Elbow Lake
Patch, Wallace T. Rochester
Passalacqua, Luis A. Rochester
Passer, A. A. Olivia
Patterson, W. E. Minneapolis
Patterson, W. E. Westbrook
Patterson, W. L. Fergus Falls
Paul, L. W. Canby
Paulsen, E. L. Minneapolis
Paulson, T. S. Fergus Falls
Payette, C. H. Duluth
Pearce, Naboth O. Minneapolis
Pearson, F. R. St. Paul
Pearson, William T. Finlayson
Pedersen, A. H. St. Paul
Pederson, Harold Minneapolis
Pederson, O. J. Hanaka
Pederson, R. M. Minneapolis
Pemberton, J. deJ. Rochester
Penhall, F. W. Morton
Pennie, D. F. Duluth
Penny, L. E. St. Paul
Peppard, T. A. Minneapolis
Perry, C. G. St. Paul
Perry, Clarence L. Rochester
Perry, Ralph St. J. Minneapolis
Persons, C. E. Marshall
Petersen, J. R. Minneapolis
Petersen, Thorvald Minneapolis
Peterson, Alfred Dassel
Peterson, A. A. Mora
Peterson, Joel A. Rochester
Peterson, Magnus C. St. Peter
Peterson, O. H. Minneapolis
Peterson, O. L. Cokato
Peterson, R. A. Vesta
Peterson, V. N. St. Paul
Peterson, Willard C. Minneapolis
Petit, L. J. Minneapolis
Petter, Charles K. Oak Terrace
Pettit, C. W. Minneapolis
Pieffer, Theodore J. Rochester
Phelps, Kenneth A. Minneapolis
Phillips, A. E. Delano
Phillips, W. H. Jordan
Pierce, Chas. H. Wadena
Pierson, Claude M. Wheaton
Piper, M. C. Rochester
Piper, Wm. A. Mountain Lake

Platou, E. S. Minneapolis
 Plondke, F. J. St. Paul
 Plonske, C. J. Faribault
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Poirier, J. D. Forest Lake
 Pollard, L. W. Minneapolis
 Pollock, L. W. Rochester
 Polzak, Jacob A. Minneapolis
 Pope, Charles E. Rochester
 Poppe, Fred H. Minneapolis
 Porter, O. M. Minneapolis
 Power, J. E. Duluth
 Prangen, A. D. Rochester
 Pratt, Fred J. Minneapolis
 Pratt, J. A. Minneapolis
 Preine, I. A. Minneapolis
 Prendergast, H. J. St. Paul
 Prescott, Manfred U. Rochester
 Prickman, Louis E. Rochester
 Priestley, Joseph B. Rochester
 Pritchard, D. B. Winona
 Prim, J. A. Minneapolis
 Prosek, Chas. E. Minneapolis
 Prout, Curtis T. Rochester
 Puestow, Charles B. Rochester

Quale, Victor S. Rochester
 Quigley, T. C. Owatonna
 Quinby, Thos. F. Minneapolis
 Quist, H. W. Minneapolis

Raadge, C. S. Hibbing
 Radabaugh, R. C. Hastings
 Radtke, H. P. Rochester
 Raihala, John Virginia
 Raiter, Franklin W. S. Cloquet
 Raiter, Roy L. Cloquet
 Rains, J. M. Willmar
 Ramsay, W. R. St. Paul
 Randall, Lawrence M. Rochester
 Rankin, F. W. Rochester
 Rapp, E. W. Duluth
 Rathbun, A. M. Rice
 Rathbun, C. A. St. Cloud
 Rathman, Omer C. Rochester
 Reed, Chas. A. Minneapolis
 Rees, S. P. Minneapolis
 Regnier, E. A. Minneapolis
 Reineke, George F. New Ulm
 Reiter, H. W. Shakopee
 Rempel, Dietrich D. Brownston
 Rentschler, Edwin B. Rochester
 Replogle, W. H. Wabasha
 Reuter, Maurice J. Rochester
 Reynolds, I. S. Minneapolis
 Rice, Carl O. Minneapolis
 Richards, E. T. F. St. Paul
 Richards, W. B. St. Cloud
 Richardson, Fred S. Minneapolis
 Richardson, Harold E. St. Paul
 Richardson, W. E. Pipestone
 Richardson, W. J. Fairmont
 Richdorf, L. F. Minneapolis
 Ridgway, A. M. Annandale
 Ridgway, Alexander Belgrade
 Ridgway, Florence Minneapolis
 Rieniets, John H. Rochester
 Riggs, C. E. St. Paul
 Rigler, Leo G. Minneapolis
 Rishmiller, J. H. Minneapolis
 Risser, E. D. Winona
 Ritchie, H. P. St. Paul
 Rivers, A. B. Rochester
 Rizer, R. I. Minneapolis
 Roadman, I. M. Ponsford
 Roan, Carl M. Minneapolis
 Robb, Edwin F. Minneapolis
 Robbins, C. P. Winona
 Roberts, L. M. Little Falls
 Roberts, Thos. S. Minneapolis
 Roberts, W. B. Minneapolis
 Robertson, A. W. Littlefield
 Robertson, H. E. Rochester
 Robertson, J. B. Cottonwood
 Robertson, W. P. Littlefield
 Robertson, P. A. Austin
 Robilliard, C. M. Faribault
 Robilliard, W. H. Faribault
 Robinson, J. M. Duluth
 Robitschek, E. C. Minneapolis
 Rochford, W. E. Minneapolis
 Rodda, F. C. Minneapolis
 Rodgers, C. L. Minneapolis
 Roehlike, A. B. Elk River
 Rogers, James C. T. Rochester
 Rogers, John T. St. Paul
 Roholt, C. L. Waverly
 Rood, D. C. Duluth
 Rose, J. T. Lakefield
 Rosen, S. Minneapolis

Rosenberg, George C. Minneapolis
 Rosenberg, Maurice N. Minneapolis
 Rosenholtz, Burton St. Paul
 Rosenow, E. C. Rochester
 Rosenthal, Robert St. Paul
 Rosenwald, R. M. Minneapolis
 Rousseau, Victor Maple Lake
 Rothenburg, J. C. Springfield
 Rothrock, J. L. St. Paul
 Rothschild, H. J. St. Paul
 Roust, H. A. Montevideo
 Rowe, O. W. Duluth
 Rowe, Paul H. Minot, N. D.
 Rowntree, L. G. Rochester
 Roy, J. A. Red Lake Falls
 Roy, Philemon St. Paul
 Rubenstein, Myer W. Rochester
 Rucker, Charles W. Rochester
 Rucker, William H. Minneapolis
 Rudell, Gustave Minneapolis
 Rudie, P. L. Duluth
 Rudemann, Ehckardt Rochester
 Rubberg, George N. St. Paul
 Rumpf, C. W. Faribault
 Rumpf, W. H. Faribault
 Rumpf, William H., Jr. Minneapolis
 Rutherford, W. C. St. Paul
 Rutledge, L. H. Detroit Lakes
 Ryan, John J. St. Paul
 Ryan, Mark E. St. Paul
 Ryan, W. J. Duluth

St. Clair, G. G. Duluth
 Sadler, Wm. P. Minneapolis
 Saffert, Cornelius A. New Ulm
 Sahr, W. G. Hutchinson
 Salterman, B. I. Janesville
 Sanderson, E. T. Minnesota
 Sanford, A. H. Rochester
 Satersmoen, Theo. Pelican Rapids
 Sather, Allen Fosston
 Sather, E. R. Alexandria
 Satterlee, H. W. Lewiston
 Satterlund, Victor St. Paul
 Savage, F. J. St. Paul
 Sawatzky, Wm. A. Minneapolis
 Sawyer, H. P. Goodhue
 Schaaf, F. H. K. Minneapolis
 Schacht, Fredk. W. Rochester
 Schaefer, S. Winona
 Schaefer, Wesley G. Minneapolis
 Schatz, F. J. St. Cloud
 Scheldrup, N. H. Minneapolis
 Schnarrenberger, G. Winona
 Scherer, C. A. Duluth
 Scherer, Roland G. Morgan
 Schlesselman, J. T. Mankato
 Schlutz, Frederic W. Minneapolis
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 Schmitt, A. F. Minneapolis
 Schmitt, S. C. Minneapolis
 Schneider, H. A. Jordan
 Schoch, J. L. New Ulm
 Schoch, K. B. St. Paul
 Scholpp, O. W. Hutchinson
 Schons, E. St. Paul
 Schroder, C. H. Duluth
 Schult, F. C. St. Paul
 Schultz, J. A. Albert Lea
 Schulze, Albert G. St. Paul
 Schussler, Otto F. Minneapolis
 Schwartz, Virgil J. Minneapolis
 Schwyzer, Arnold St. Paul
 Schwyzer, Gustav Minneapolis
 Schwyzer, R. Minneapolis
 Scofield, C. L. Benson
 Scott, F. H. Minneapolis
 Scott, R. A. Detroit Lakes
 Seashore, D. E. Duluth
 Seashore, Gilbert Minneapolis
 Seham, Max Minneapolis
 Seifert, Otto J. New Ulm
 Selleseth, Ives Minneapolis
 Senkler, G. E. St. Paul
 Senn, E. W. Owatonna
 Setzer, H. J. St. Paul
 Shafter, Royce R. Rochester
 Shaleen, A. W. Hallock
 Shannon, S. S. Crosby
 Shannon, W. Ray St. Paul
 Shapiro, E. Z. Duluth
 Shapiro, Morse J. Minneapolis
 Shaw, A. W. Buhl
 Shedd, A. Fosston
 Sheedy, Chester L. Austin
 Shelland, J. T. Ada
 Shellman, John L. St. Paul
 Sheldon, W. D. Rochester
 Shelver, H. J. Ortonville
 Sheppard, Fred Hutchinson
 Sheppard, P. E. Hutchinson
 Sherman, Carnot H. Bayport

Sherman, C. L. Luverne
 Sherping, O. Th. Fergus Falls
 Sherwood, G. E. Kimball
 Sherwood, K. K. Stillwater
 Shillington, M. A. St. Paul
 Shrader, J. S. Springfield
 Simison, C. W. Hawley
 Simon, B. F. St. Paul
 Simons, Jalmar Minneapolis
 Simons, Bernard H. Chaska
 Simons, Edwin J. Swanville
 Simpson, E. D. Minneapolis
 Simpson, J. D. Minneapolis
 Siperstein, D. M. Minneapolis
 Sisler, C. E. Grand Rapids
 Sistrunk, W. E. Rochester
 Sivertsen, Andrew Minneapolis
 Sivertsen, Ivar Minneapolis
 Skinner, H. O. St. Paul
 Slater, S. A. Worthington
 Slocumb, J. A. Plainview
 Slocumb, Maude S. Minneapolis
 Slyfield, F. F. Duluth
 Smallwood, J. T. Worthington
 Smersh, J. F. Owatonna
 Smith, A. M. Minneapolis
 Smith, Arthur E. Minneapolis
 Smith, B. A. Crosby
 Smith, C. M. Duluth
 Smith, E. K. Duluth
 Smith, F. L. Rochester
 Smith, F. D. Kasson
 Smith, Harry L. Rochester
 Smith, Homer R. Minneapolis
 Smith, L. G. Montevideo
 Smith, Leonard M. Rochester
 Smith, M. W. Red Wing
 Smith, Newton D. Rochester
 Smith, Norman S. Minneapolis
 Smith, P. A. Faribault
 Smith, William M. Rochester
 Snell, Albert M. Rochester
 Snyder, G. W. St. Paul
 Soderlund, A. Minneapolis
 Sogge, L. Windom
 Sohlberg, Olaf St. Paul
 Sohm, A. E. Mankato
 Solhaug, S. B. Minneapolis
 Sommer, A. W. Elmore
 Souster, B. B. St. Paul
 Spanuth, John R. Rochester
 Spicer, F. W. Duluth
 Spooner, Christopher M. Rochester
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 Spratt, C. N. Minneapolis
 Squire, Fay H. Rochester
 Stacy, L. J. Rochester
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 Stark, W. B. Rochester
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 Stelter, Lloyd A. Minneapolis
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 Sterner, E. G. St. Paul
 Sterner, O. W. St. Paul
 Steven, Geo. Byron
 Stevens, F. A. Lake Elmo
 Stewart, John A. Rochester
 Stewart, Alexander St. Paul
 Stewart, A. B. Owatonna
 Stewart, C. A. Minneapolis
 Stewart, Nelson W. Brainerd
 Stewart, R. I. Lindstrom
 Stierle, Adolph, Jr. St. Paul
 Stillwell, W. C. Mankato
 Stinnette, S. E. St. Paul
 Stolpestad, H. L. St. Paul
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 Strathern, F. P. St. Peter
 Strathern, M. L. Gilbert
 Stratte, A. K. Pine City
 Stratte, Harold C. Pine City
 Stratte, J. J. Pine City
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 Strickler, Mary Sleepy Eye
 Strobel, W. G. Duluth
 Strout, E. S. Minneapolis
 Strout, G. Elmer Minneapolis
 Stryker, W. B. Plainview
 Stuhler, Louis G. Rochester
 Stuart, A. B. Cloquet
 Suhr, J. R. Stillwater
 Surre, J. R. Minneapolis
 Sukeforth, L. A. Duluth
 Sundt, M. Minneapolis
 Sussex, Lloyd T. Rochester
 Sutherland, C. G. Rochester
 Sutherland, H. N. Ely
 Sutton, Chas. S. St. Cloud
 Sutton, L. F. Mazeppa
 Swanson, Edwin O. St. Paul

Swanson, John A. St. Paul
Swanson, Roy E. Minneapolis
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Swedenburg, A. W. Thief River Falls
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Sweetser, H. B., Sr. Minneapolis
Sweetser, Theodore Minneapolis
Sweetzer, S. E. Minneapolis
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Swendseen, Carl G. Minneapolis
Swendson, J. L. St. Paul
Swennes, O. S. Wabkon
Swenson, Charles Braham
Swenson, O. J. Waseca
Swezey, B. F. Buffalo
Sybilrud, H. W. Briceyn

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Tanquist, E. J. Alexandria
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Taylor, Joseph Minneapolis
Taylor, H. L. St. Paul
Taylor, Rood Minneapolis
Taylor, Wm. J. Pipestone
Teisberg, C. B. St. Paul
Ternstrom, O. H. Minneapolis
Tessier, W. O. Oklee
Thabes, J. A., Sr. Brainerd
Thabes, John A., Jr. Brainerd
Thompson, Arthur Raymond
Thomas, Geo. E. Minneapolis
Thomas, Geo. H. Minneapolis
Thomas, Gilbert J. Minneapolis
Thomas, Lester C. Rochester
Thompson, Albert St. James
Thompson, Fred R. Rochester
Thompson, Gershom J. Rochester
Thompson, H. H. Minneapolis
Thompson, H. L. Rochester
Thompson, V. C. Marine-on-St. Croix
Thordarson, Theo. Minneota
Thornby, H. J. Moorhead
Thorsen, Thor. Oslo, Norway
Thorson, E. O. Luverne
Thorsen, Orin P. Northfield
Thysell, F. A. Moorhead
Tibbetts, M. H. Duluth
Tiber, L. J. St. Paul
Tiedemann, Elmer J. Adrian
Tierney, C. M. Harmony
Tilderquist, D. L. Duluth
Tingdale, A. C. Minneapolis
Tinkess, Donald E. Rochester
Tofte, Josephine Dawson
Torkelson, P. T. Lyle
Townsend, DeWayne Brooten
Traeger, C. A. Faribault
Traxler, Felix J. Henderson
Tregilgas, H. R. South St. Paul
Trutna, Thos. J. Silver Lake
Tunstead, Hugh J. Minneapolis
Tuohy, E. L. Duluth
Turnaciff, D. D. Minneapolis
Turnbull, Robert Fosston
Tweedy, G. J. Winona
Tyrrell, C. C. Minneapolis

Ude, Walter H. Minneapolis
Ulrich, Henry L. Minneapolis
Undine, Clyde A. Minneapolis
Urbeg, S. E. Duluth
Urner, John A. Minneapolis

Vaaler, T. Rochester
Vadheim, Alfred L. Tyler
Vail, James B. Henning
Valentine, W. H. Tracy
Van Slyke, Chas. A. St. Paul
Van Valkenburg, B. F. Long Prairie
Van Valkenburg, F. W. Long Prairie
Vanzant, Frances R. Rochester
Vercellini, C. E. Duluth
Vickery, Eugene B. Rochester
Viecelli, James D. Rochester
Vik, Melvin Onamia
Vinson, P. P. Rochester
Vistaunet, P. S. Shelly
Vivian, R. S. Hibbing
Vogel, Joseph H. New Ulm
Vogel, Melvin A. Minneapolis
Von Berg, J. P. Albert Lea
Vonder Weyer, Wm. St. Paul
Von Lackum, W. H. Rochester
Voyer, Emile O. Minneapolis
Vrooman, F. E. St. Francis

Waas, Charles W. St. Paul
Wagener, H. P. Rochester
Wahlquist, Harold F. Minneapolis
Waldron, Carl W. Minneapolis
Walker, A. E. Duluth
Walker, G. H. Winona
Walker, R. E. St. Paul
Wall, C. R. Northfield
Waller, Joseph D. Wilmont
Wallinga, John H. St. Paul
Walters, Waltman Rochester
Wanous, E. Z. Minneapolis
Ward, A. W. Minneapolis
Ward, Percy A. Minneapolis
Warham, T. J. Minneapolis
Warnock, R. W. St. Paul
Warren, E. L. St. Paul
Warren, F. S. Faribault
Watkins, C. H. Rochester
Watson, A. M. Royalton
Watson, F. G. Worthington
Watson, J. A. Minneapolis
Watson, N. M. Red Lake Falls
Wattam, G. S. Warren
Webb, R. C. Minneapolis
Webber, Edward E. Duluth
Weber, H. M. Rochester
Weber, M. L. Duluth
Webster, H. E. Duluth
Weir, J. D. Beardsley
Weir, J. F. Rochester
Weirick, Howard R. Hibbing
Weiser, Geo. B. New Ulm
Weisman, S. A. Minneapolis
Weissgerber, L. A. New Ulm
Wellbrock, Wm. L. A. Rochester
Welch, M. C. St. Paul
Wellcome, J. W. B. Sleepy Eye
Welles, H. J. Minneapolis
Wentworth, A. J. Mankato
Werner, O. S. St. Paul
Westby, Magnus Duluth
Westby, Nels Madison
Westerman, A. E. Montgomery
Westerman, F. C. Montgomery
Wethall, A. G. Minneapolis
Wetherby, Macnider Minneapolis
Weum, T. Wm. Minneapolis
Wheeler, M. W. St. Paul
Wheeler, D. W. Duluth
Wheeler, Theodora Rochester
Whetstone, Mary S. Minneapolis
Whitcomb, J. C. St. Paul

Whitcomb, Ed H. St. Paul
White, J. S. St. Paul
White, Robert B. Rochester
White, S. Marx Minneapolis
White, Willard D. Minneapolis
Whitmore, Frank St. Paul
Whitney, A. W. St. Paul
Whitten, Merritt B. Rochester
Wickham, Mont. Cecil Rochester
Widen, W. F. Minneapolis
Wiess, H. F. B. Minneapolis
Wilcox, Arch E. Minneapolis
Wilcox, F. L. Walker
Wilder, Robert L. Minneapolis
Wilder, R. M. Rochester
Wilhelmj, Charles M. Rochester
Wilken, Paul A. Minneapolis
Wilkinson, Stella Duluth
Will, W. W. Bertha
Willcutt, Clarence Minneapolis
Williams, A. B. St. Paul
Williams, Clayton St. Paul
Williams, H. L. Minneapolis
Williams, Henry L., Jr. Rochester
Williams, Leon A. Slayton
Williams, Robert Minneapolis
Williams, R. J. Pine River
Williams, R. George A. Rushford
Williamson, N. V. Rochester
Willius, F. A. Rochester
Wilmot, H. E. Litchfield
Wilson, C. E. Blue Earth
Wilson, L. B. Rochester
Wilson, Warren Northfield
Wilson, W. E. Northfield
Wilson, W. F. Lake City
Wiltout, I. Geo. Oslo
Winnick, J. B. St. Paul
Winter, J. A. Duluth
Witham, C. A. Minneapolis
Wittich, F. W. Minneapolis
Wohlrahe, A. A. Minneapolis
Wohlrahe, Clarence Springfield
Wohlrahe, E. J. Springfield
Wold, K. C. St. Paul
Wolfe, H. H. St. Paul
Woltman, H. W. Rochester
Wood, Douglas F. Minneapolis
Wood, H. G. Rochester
Woodruff, C. W. Chatfield
Woodworth, Elizabeth Minneapolis
Workman, H. M. Tracy
Workman, W. G. Tracy
Wray, W. E. Campbell
Wright, C. B. Minneapolis
Wright, Charles Da. Minneapolis
Wright, C. O. Luverne
Wright, Franklin R. Minneapolis
Wright, William C. Rochester
Wynne, H. M. N. Minneapolis

Yaeger, W. W. Ivanhoe
Yesko, Stephan A. Rochester
Ytisaker, R. S. Minneapolis
Yoerg, O. W. Minneapolis
Young, T. O. Duluth
Young, V. A. Duluth

Zachman, A. H. Melrose
Zander, C. H. St. Paul
Zaworski, E. A. Minneapolis
Zeien, Thos. North Branch
Ziegler, Lloyd H. Rochester
Zierold, A. A. Minneapolis
Zimmermann, H. B. St. Paul
Zlatovski, Michael Duluth